

CLASSIFIED ADVERTISING

RATES: Fifty words or less in 6-point light-face type only, one insertion, \$2.00, additional words four cents each. Three consecutive insertions \$5.00, additional words ten cents each.

PAYMENT in advance is required for advertising in this column.

REPLIES to advertisements with Box No. should be addressed to Air Conditioning & Refrigeration News, 5229 Cass Ave., Detroit, Mich.

POSITIONS AVAILABLE

SALES MANAGER for active field work in securing sales supervisors and dealers in eastern states for nationally known manufacturer of commercial refrigerated display equipment. Experience in this line absolutely essential. Write fully, including salary wanted. Box 1062, Air Conditioning & Refrigeration News.

POSITIONS WANTED

AIR CONDITIONING sales engineer seeks new connection. Wide experience in setting up and contacting distributor and dealer accounts throughout the U. S. A. Able to estimate, lay out and supervise installation of all types of air conditioning work. University graduate. Box 1060, Air Conditioning & Refrigeration News.

AIR CONDITIONING and refrigeration engineer desires permanent connection with reliable firm. Technical training by leading manufacturer in all phases of air conditioning, refrigeration, heating, and ventilation. Four years' experience in service and installation. Able to design, engineer, estimate and supervise air conditioning and refrigeration installations. Best of references. Box 1061, Air Conditioning & Refrigeration News.

SALES ENGINEER (age 30) at present factory representative for nationally known manufacturer. Working and holding lectures with jobbers and manufacturers in the East, South and Midwest. Has spent nine years in the industry, having had service, factory, field and sales engineering experience. Desires permanent connection. Box 1059, Air Conditioning & Refrigeration News.

ENGINEER WITH sales experience available July 25. Electrical engineering graduate. Age 26. Free to travel. With major manufacturer and factory branch 2 1/2 years. Experimental, testing, research, residential and commercial air conditioning and refrigeration applications, cost estimating, proposals, heating surveys, and sales engineering. Teaching and executive ability. Personnel record if requested. Box 1057, Air Conditioning & Refrigeration News.

SALES ENGINEER, air conditioning and commercial refrigeration. Wide experience contacting dealers and conducting sales engineering schools. Background includes consulting engineering, heating and sheet metal contracting. Intimate knowledge of every phase of the business. Have travelled extensively and now free to travel. Capable of taking full charge and producing results. Address Box 1058, Air Conditioning & Refrigeration News.

EQUIPMENT WANTED

INTERESTED IN purchasing 500 to 1,000 1/2 and 1/4 H.P. refrigeration motors—new or used repulsion induction or capacitor type. Also interested in purchasing single or twin cylinder late type household compressors. Any quantity. FEDERAL REFRIGERATOR CORP., 57 E. 25th St., New York City.

REPAIR SERVICE

GENERAL ELECTRIC and Westinghouse hermetic units rebuilt. Guaranteed unconditionally for one year and returned to you refinished like new. Units are entirely disassembled in our large modern shop, tested through every step of production during rebuilding with the most complete test equipment for accurate work, then subjected to exhaustive running tests under actual operating conditions. Each unit measures to exacting standards after rebuilding. Prices \$30.00 on General Electric DR-1, DR-2, and Westinghouse; \$35.00 on General Electric DR-3. Quotations furnished on other models. Quick service—guaranteed work. REFRIGERATION MAINTENANCE CORP., 365 East Illinois St., Chicago, Ill.

DOMESTIC CONTROLS repaired: Ranco pencil \$1.75, Ranco box \$2.00, General Electric \$2.00, Tag \$2.00, Cutler-Hammer \$2.00, Penn \$2.00, Bishop Babcock \$2.50, Majestic \$2.50, Penn magnetic \$2.50, G. E. Frigidaire \$2.50. In business over 20 years. Our name is our guarantee. UNITED SPEEDOMETER REPAIR CO., INC., 436 West 57th Street, New York City.

MAJESTIC UNIT Replacements—The only original direct factory Majestic replacements. Guaranteed 18 months in writing. All models \$30.00. Immediate delivery from our stock of 2,000 units. Also G. E. and Westinghouse rebuilding guaranteed 18 months from \$30.00 up. Largest rebuilders of Hermetics in the world. G & G GENUINE MAJESTIC REFRIGERATOR AND RADIO PARTS SERVICE, 5801 Dickens, Chicago.

CONTROL REPAIR service. Your controls repaired by expert mechanics, with special precision equipment. Supervised by graduate engineers. We stress perfection and dependability before price. One year guarantee on domestic controls. Any bellows operated device repaired. HALECTRIC LABORATORY, 1793 Lakeview Road, Cleveland, Ohio.

100% SATISFACTION GUARANTEED—Hermetic rebuilding service. G.E.—Westinghouse—Majestic—U. S. Hermetic—etc. Our success in rebuilding sealed units is founded on these facts—10 years in the refrigeration industry—5 years' concentrated effort on hermetically sealed units. Customers in 37 states had hermetically sealed units rebuilt or exchanged by us

in the past year. Complete factory equipment for precision rebuilding. One year guarantee on all rebuilt units. Exchange service available on most makes and models. Write for prices and descriptive literature. REX REFRIGERATION SERVICE, INC., 2226 S. State St., Chicago, Ill.

PATENTS

HAVE YOUR patent work done by a specialist. I have had more than 25 years' experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. H. R. VAN DEVENTER (ASRE), Patent Attorney, 342 Madison Avenue, New York City.

Work Hours & Trade Policies Are Covered In Salesmen's Pact

(Concluded from Page 1, Column 4)

the recession." Under the terms, association members agree to abide by both the code and the Illinois fair trade law.

Another section of the agreement provides that "to sell or offer for sale any product of the industry with intent to deceive customers or prospective customers as to the quantity, quality, substance, or size of such product shall be considered a violation of this agreement."

Under the agreement, the association recognizes the union as the sole bargaining agent for the salesmen in association-members' stores, and the union recognizes the association as sole representative of the employers.

The association agrees that its salesmen, not now members of the union, shall become members; that any new salesman shall not be retained unless within five days of commencing employment the man obtains a work permit from the union for a 90-day probationary period. At the end of the 90-day period, the employer may elect to retain the salesman.

STORE HOURS

Stores may open at 9 a.m. and close at 10 p.m. on Mondays, Tuesdays, Thursdays, and Saturdays, the agreement provides. On Wednesdays and Fridays, closing hour is set at 6 p.m. Each salesman is allowed one morning off each week on a day on which the store remains open until 10 p.m. All stores must remain closed on Sundays.

During the two weeks before Christmas, stores may be kept open until 10 p.m. each work day. No salesman can work more than store hours.

Minimum salary of \$25 a week is agreed upon, whether the arrangement between employer and salesman calls for straight salary, salary and drawing account, or drawing account only.

Salesmen's commissions are figured on the net sale of merchandise sold, exclusive of finance charge, sales tax, and trade-in allowance. Salesmen are not to be charged for or made to repay any commissions on sales by reason of replevins, returns, or repossession after 120 days following date of delivery of merchandise to the customer. Commissions are payable at the time the salary or drawing account is paid.

SENIORITY?

Seniority in lay-offs is another feature of the contract, which also provides that the employer can terminate a salesman's employment in cases where the salesman's commissions for a single month do not equal the amount of his salary or drawing account.

The agreement provides for vacations—one week with pay for employment during a full fiscal year, and two weeks when employed for two or more years. Vacation period pay is to be figured on the minimum of \$25 or the salesman's regular weekly drawing account, and is not chargeable against the salesman's salary, advancements, or commissions.

CODE BANS

In the dealer association's code of fair trade practices, which went into effect July 1, complete schedule of trade-in allowances for major appliances is provided, in addition to regulations designed to curb several selling abuses.

The code bans the offering by the appliance dealer of any combination sale at less than the combined price of the various appliances included in it; the offering of any free goods as a buying inducement, unless authorized by the manufacturer or distributor,

and available to all dealers in that line; and the acceptance of an order by the dealer from a customer who has previously signed a similar order with another member of the association.

False and misleading advertising in newspapers, bills, store signs, or on radio broadcasts is forbidden by the code, as are sales by one dealer to another who is not regularly franchised to handle the same brand of merchandise.

Also forbidden by the code are trade-in allowances by recognized retail appliance dealers in excess of the following provisions:

Electric Refrigerators:

Up to 8% of list price on an ice-box.

Up to 15% of list price on electric refrigerators manufactured before 1934.

Up to 25% of list price on electric refrigerators manufactured in 1934 or 1935.

Up to 33 1/3% of list price on electric refrigerators manufactured after 1935.

Ten per cent discount from list price may be allowed on sales consisting of two or more units delivered to one address at the same time, and 15% on three units delivered to one address at the same time.

Where four or more units are sold to one address and delivered at the same time, it shall be on a cost-plus-10%-profit basis.

Radios:

Where the manufacturer, distributor, or wholesaler authorizes a stated trade-in allowance, this may

be used, plus 5% maximum additional allowance for cash on the net selling price of radios selling for more than \$49.95.

Where there is no stated allowance . . . a dealer may allow 10% of the list price for any old radio manufactured prior to 1937, provided the allowance does not exceed 50% of the list price of the radio being turned in.

Under the same conditions, the dealer may allow 25% of the list price for any old radio manufactured after 1937, provided the allowance does not exceed 50% of the list price of the radio being traded in.

Auto Radios:

All auto radios must be sold at the list price, can be installed at no extra charge, with a maximum guarantee of 90 days. All accessories used in making the installation must be sold at the list price.

A maximum trade-in allowance of up to 15% on auto radios not older than 1936 models is permitted. Auto radio antennas must be sold at regular list price.

Gas Ranges:

Ten per cent is the maximum allowed for any old range on the purchase of a new gas range at list price.

Electric Ranges:

Ten per cent is the maximum allowance for any range over five years old.

Fifteen per cent of list price is the maximum allowance for any electric range less than five years old.

Washers, Ironers, and Oil Burners:

On any of these appliances selling

Promotes Range Line



L. J. HANNAH

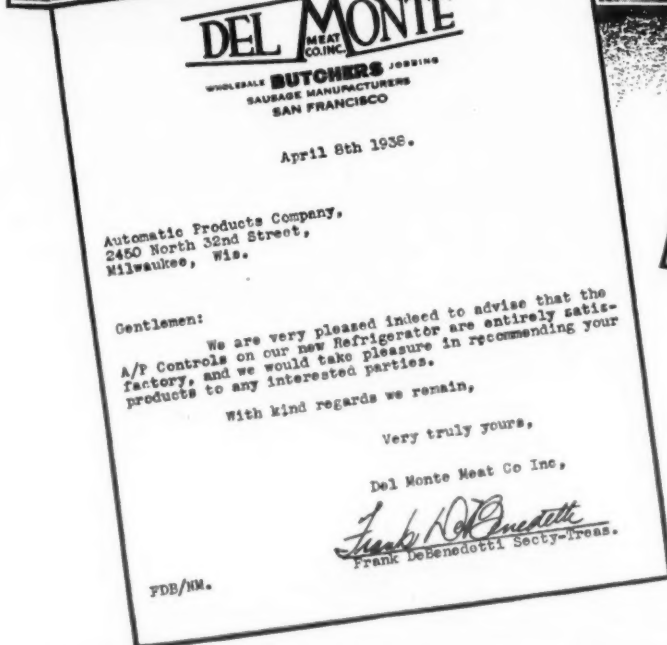
Just appointed eastern district manager for the Standard Electric Mfg. Co. He will make his headquarters in New York City.

at \$69.50 or less, the maximum allowance for old equipment is 10% of list price; on those selling for more than \$69.50, maximum trade-in allowances are not to exceed 15% of list price.

Vacuum Cleaners:

On any of these appliances selling at \$49.50 or less, maximum allowance for old equipment is 10% of list price; on those selling for more than \$49.50, maximum allowances are not to exceed 15% of list price.

250 BEEVES . . at 32° to 36° F.



Installation . . . Del Monte Meat Co., Inc. San Francisco, Calif. Storing 250 Beeves at One Time

Refrigeration Unit . . . Mills Company

Installed by . . . Oris Olsen Refrigerator Co. San Francisco, Calif.

VALVES 6 No. 210 A-P Thermostatic Expansion Valves

Purchased through . . . California Refrigerator Co. San Francisco, Calif.

For human comfort or food preservation—wherever exacting refrigeration control is demanded—there is the place for an A-P Thermostatic Expansion Valve.

Refrigeration Engineers are invited to see an A-P Thermostatic Expansion Valve or Solenoid in use—anywhere, on any size installation. Judge all A-P Valve Service on the satisfaction of any ONE, if you wish. It's complete Dependability on every installation, without exceptions, that has built the A-P reputation.

Next time, use an A-P Valve if you would enjoy freedom from valve-trouble—and your customer's satisfaction.

AUTOMATIC PRODUCTS COMPANY 2450 NORTH THIRTY-SECOND STREET MILWAUKEE WISCONSIN

Export Department, 100 Varick Street, New York City

DEPENDABLE

THE BYWORD FOR A-P VALVES



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The Newspaper of the Industry

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THE COLD CANVASS

By B. T. Umore

Save the Circus!

From Fred Shaw, one of the ace idea men connected with the electrical appliance industry, comes a plea to "save the circus for the kids."

It's Fred's theory that the advertising and merchandising men of the country can get together and figure out a way to put the Ringling Bros. & Barnum & Bailey circus, which has been disbanded because of labor troubles, back into circulation "for the kids." (It's B.T.U.'s candid opinion that the grown-up kids miss it most.)

Cries Fred:

"This movement is subsidized by no one. All we want is just one thing. We want the BIGGEST circus back on the road so we can see it and so our kids can see it."

"The kids of labor want to see the big show just as much as the kids of capital. We don't want any makeshifts or substitutes for the Greatest Show on Earth. And we're going to raise hell until we get it back."

"If we can lick this thing and get the show back on the road, we will automatically be licking a lot of other things that have been bothering us lately in this grand country of ours. And we'll have a lot of fun doing it, if we keep good-natured!"

Idea Man

Fred, in case you recognize the face but can't quite place the name, is a public relations scientist with Geyer-Cornell-Newell, which has the Nash-Kelvinator account. Currently, he has been having a lot to do with the promotion of George Mason's National Salesmen's Crusade ("Sales Mean Jobs").

For years he has been roaring down the highway at the wheel of new ideas. (Example: When he was promoting the Florist's Telegraph Delivery Service, he conceived the idea of getting Walter Winchell to send orchids to deserving citizens—actually as well as in his column.)

What is most significant about Fred and his ideas is that he isn't the kind of fellow who gets an idea and drops it into somebody else's lap. Fred sees it through.

So maybe we'd all better pay some attention to his "Save the Circus" plan.

The Sports Page

Powel Crosley's Cincinnati Reds have been shoved down into third place in the National League pennant chase by the prolonged winning streak of the amazing Pittsburgh Pirates, but no true Red fan is discontented for a minute.

Look at the All-Star game which, incidentally, was held in Cincinnati, surrounded by typical Crosley showmanship. The Reds had four men on the National League team: Vander Meer, Lombardi, Goodman, and McCormick.

And look at the latest summary of percentages on the leading hitters in the league. The Reds have four out of the first five! This is almost unprecedented in either major league.

Lombardi is leading with an average of .364. Berger ranks second; and Goodman and McCormick are tied for fourth and fifth. Goodman, incidentally, still leads the National League's home run hitters.

Only outsider able to push his way into this quintet of leading batsmen is Joe Medwick of the St. Louis Cardinals.

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Conditioner Sales In Boston Up For First 6 Months

BOSTON—Air conditioning sold in the Boston area during the first five months of this year shows an increase over the same period of 1937, both in tonnage and number of jobs sold, reports Daniel Ricker, secretary of the Air Conditioning Bureau of Boston.

A total of 42 sales were reported in the first five months of this year, amounting to 827 hp. of capacity. This compares with 36 installations made during a similar period of 1937, when 779 connected hp. were placed in service.

Volume of business increased sharply in June of this year with 16 installations reported having a total of 177 hp. Total for the first half of 1938 was 58 installations having 1,004 connected hp.

The Air Conditioning Bureau of Boston, headed by Henry R. Sewell as president, has fostered the advancement of air conditioning and coordinated the efforts of those associated with the industry during the past five years. The bureau now has a membership of more than 200.

Charles Gary Slightly Injured In Airplane Crash At Billings

BILLINGS, Mont. — Charles V. Gary, sales manager of Henry Valve Co., Chicago, escaped with minor injuries when a Northwest Airlines plane in which he was a passenger crashed at the end of the field while taking off here early on the morning of July 8 on a flight to Chicago.

Mr. Gary's injuries included a black eye, cut cheek, and bruises on legs and back. Undaunted by his shaking up, Mr. Gary, after receiving first aid treatment, caught another plane from Billings to Minneapolis, and flew from there to Chicago.

The air liner carried eight passengers and a crew of two. One woman was killed in the accident, and the other seven passengers received injuries of various degrees. Neither of the two co-pilots was injured.

The plane, one of the newer Zephyr 14-H type, the same model that plunged to earth at Bozeman, Mont. several months ago with the loss of eight lives, was demolished when it smashed on a small knoll after wobbling to earth. As the tail and one wing struck first, the pilot cut the switch, preventing fire.

Fors, Wyld New Airtemp Vice Presidents

DAYTON, Ohio—Appointment of A. R. Fors and R. G. Wyld as vice presidents of Airtemp, Inc., air-conditioning subsidiary of Chrysler Corp., has been announced by A. C. Downey, president.

Mr. Fors, works manager of the Airtemp plant for the past year, has been named vice president in charge of manufacturing, and Mr. Wyld, executive engineer here since 1935, has been promoted to vice president in charge of engineering.

Mr. Fors came to Airtemp from

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Hoye Directs Savage Arms Ice Cream Cabinet Sales

UTICA, N. Y.—T. E. Hoye has been appointed sales manager of the ice cream cabinet division of Savage Arms Corp.

Mr. Hoye joined Savage two years ago, after 10 years of experience as manager of the cabinet division of a large ice cream manufacturer. Formerly a resident of Detroit, he will now reside in Utica.

Overall Increase Shown In Export Of Refrigerators

1937's Greatest Gain In Commercial Boxes; South Africa Leads

WASHINGTON, D. C.—Both number and value of household and commercial electric refrigerators and electric refrigerator parts exported by American manufacturers during 1937 registered increases over figures for the preceding year, according to preliminary statistics just issued by the Bureau of Foreign & Domestic Commerce of the U. S. Department of Commerce.

Household electric refrigerators exported during 1937 totaled 167,862 units, valued at \$12,754,616. This compares with exports of 160,782 units, valued at \$11,767,666 during 1936.

Commercial refrigerator exports numbered 30,709 units, worth \$2,483,695, as against 24,297 units valued at \$2,234,191 in 1936. Exports of refrigerator parts during 1937 were valued at \$5,419,928, compared with \$5,169,543 during the preceding year. Union of South Africa continues as the best U. S. foreign customer for household refrigerators, exports to that country during last year numbering 31,005 units, as against

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Karlberg Heads New Company Producing Compressor Seals

CHICAGO—Headed by A. E. Karlberg, a new company to be known as the Chicago Seal Co. has been organized here to specialize in the development and manufacture of compressor seals for original equipment and replacement purposes.

The new line of "Chicago" seals which the company is introducing was designed after years of research carried on by Mr. Karlberg and his associates, the head of the company declares.

One of the principal features of the product, according to Mr. Karlberg, is its simple and quick installation in compressors which have "scored" or bent shafts. He claims

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500 Cities Reported In Sales Crusade; Increases Noted

DETROIT—Close to 500 cities and towns of various sizes, stretched from one end of the country to the other, have "gone crusading" for better times by entering the National Salesmen's Crusade under the "Sales Mean Jobs" slogan, according to reports made to headquarters of Nash-Kelvinator Corp., originator of the sales campaign.

From Chicago, President Oscar W. Mayer of that city's Association of Commerce reports that 60 large firms are actively behind the movement, among them such organizations as Marshall Field & Co., W. D. Allen Mfg. Co., Wieboldt Stores, Commonwealth Edison Co., Addressograph Co., Royal Typewriter Co., Hibbard, Spencer, Bartlett & Co., W. F. Quarrie & Co., Hydrox Corp., Remington-Rand, Inc., and R. Cooper Jr., Inc.

In Akron, Ohio, newcomers to the crusade ranks are North Akron Board of Trade, Akron Tire Dealers' Association, Akron Merchants Asso-

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Blunt English Tell What They Think Of Refrigerators

MANCHESTER, England—Experiences of 400 householders in the use of their electric refrigerators are analyzed in a report issued recently by the Manchester Corporation Electricity Department, utility company.

The experiences of the users were obtained by means of questionnaires sent to domestic electricity users, and were filled out voluntarily. The survey was made because the utility company thought that a great deal of real enthusiasm was felt by owners of electric refrigerators which might help to convince prospects who were debating the purchase of a unit.

The 400 returns covered 16 different makes, nearly as many varying sizes, and were filled out by householders with a wide range of income levels.

Following are the questions asked in the questionnaire and the general conclusions of the users:

ON FOOD PRESERVATION

Question 1 dealt with the value of an electric refrigerator for preserving food.

As regards milk, 98% of owners agreed that a refrigerator prevented it from going sour, while 99% found that their butter no longer went oily in hot weather. Ninety-nine per cent affirm that uncooked foods keep better in their refrigerators.

"Left-overs" can be a source of considerable economy in the home, and 96% found that their refrigerators helped them to keep portions of cooked meat, fish, etc., for several days. Most of the remaining 4% did not use left-overs.

When it came to "left-overs" of tinned food, the figure was not quite so high. Only 85% favored this practice. Of the remainder, some never used tinned food, while others, owing to the handy sizes available, never had any "left-overs" to keep.

The claim that joints of meat become more tender if kept in the refrigerator for several days before cooking was less generally appreciated, though 61% vouched for the truth of this.

The last inquiry in this section referred to salads. Ninety-nine per cent of users agreed that the ingredi-

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Salem, Ore. Dealers Form Group When Utility Drops Appliances

SALEM, Ore.—Benton Stafford of the Imperial Furniture Co. has been named president of the Willamette Valley Electric Appliance Dealers' Cooperative Association, which was organized here July 4 by appliance dealers of Salem and vicinity.

The organization will closely cooperate with the Portland General Electric Co., which is withdrawing from the appliance merchandising field, in promoting sales of electric household units.

Other officers are Ernie L. Crockatt of H. L. Stiff Furniture Co., vice president; and Douglas R. Yeater of Rush & Yeater, secretary-treasurer.

G. E. Sullivan, general division manager; Fred G. Hodge, sales supervisor; and W. M. Hamilton, Willamette valley division manager, all of the utility, explained that sales of all appliances except ranges, water heaters, space heaters, and refrigerators in the Salem area were formally discontinued July 1, and that sales of refrigerators would be stopped as soon as the company's stock was exhausted.

Decision to withdraw from merchandising activities follows present general acceptance of appliances on the part of the public so as to enable independent dealers to carry the full sales load, in connection with a co-

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Trade Rules For Cleveland Area Put Into Effect

Code Hits Trade-In Offers In Advertising; Dealers To Review Franchises

CLEVELAND—Adoption of a dual code regulating major home appliance advertising practices and a radio and home appliance merchandising program in the Cleveland trading area was announced at a recent meeting in the Cleveland News auditorium attended by more than 200 dealers, distributors, and manufacturers.

The code, which went into effect July 1, covers activities in Cuyahoga county, the territory served by most Cleveland wholesalers.

Latest development of the Cleveland Retail Appliance Dealers' Association in its fight against cut-price selling and other appliance merchandising evils, the new program and the advertising code both have the approval and endorsement of distributors.

With this greater degree of cooperation between distributors and dealers now present, the program carries more promise of successful enforcement than any of those previously attempted by the association, it is felt.

The merchandising program was outlined to the meeting by Gordon Agnew, manager of the radio and appliance department of the Bing Co., and chairman of the dealers' wholesale committee which worked out the program with distributors.

Providing for cooperative action in its enforcement, the program has been approved in its entirety by a majority of the distributors who attended the recent meeting at which it was put into shape, Mr. Agnew said.

The recommended radio and home appliance program of the association follows:

1. Dealer franchises are to have a fixed minimum net selling price as

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Pennsylvania Court Upholds Fair Trade Act In Radio Case

PHILADELPHIA — Constitutionality of the Pennsylvania fair trade act has been upheld by Judge Howard A. Davis in Common Pleas court here in a suit in equity brought by Shryock Radio Co. against the Association of the United Fraternal Buyers, Inc. Both parties to the suit are dealers in home appliances and radios.

The suit arose over the alleged sale by the buyers' association of a radio receiver to a member of the general public on Oct. 7, 1937, at a price less than that stipulated in a contract entered into between the distributor and retail dealers in that make of radio, under provisions of the Pennsylvania Fair Trade Act of June 5, 1935.

The Association of the United Fraternal Buyers, Inc., is a corporation which sells merchandise at discounts from the retail price to "members." Shryock company in its suit averred there were no qualifications or requirements for such membership, and that purchases may be made by the general public. This the defendant association denied.

In his findings of fact, Judge Davis declared that the defendant "had no knowledge of the contract entered into between the distributor and retail dealers" on radios, but that it

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English Users of Electric Refrigeration Tell How They Use It & What They Think of It

(Concluded from Page 1, Column 4)
ents of a salad gain in freshness by being kept in the refrigerator while only a few expressed the contrary opinion.

ON DEFROSTING

Question 2 dealt with the question of defrosting. "The freezing chamber of a refrigerator becomes gradually coated with frozen vapor, and the thicker this coating becomes the less efficiently will the refrigerator work. Defrosting should therefore be carried out from time to time. This is quite a simple matter and full instructions are given in every handbook; 94% of users said that they defrosted regularly—usually each week or fortnight—while the remainder defrosted 'when necessary.'"

WINTER USE

Question 3 brought to light the fact that practically nine out of every 10 owners of electric refrigerators keep them operating throughout the winter.

"This is a practice which is strongly recommended for two reasons. For one thing, there are more days of the type which favors food decay during an English winter than most people realize and in the second place, the average indoor temperature is kept high by artificial heating and this tends to spoil food."

"It is very instructive to hang a thermometer in the spot where perishable food is normally kept and to note how rarely the temperature is appreciably below 50° F., even in winter."

ON COVERING FOOD

Question 4 raised the question of covering food when placed in the refrigerator. "Seventy-three per cent of users—practically three out of every four—appreciated the advantage of this, and there can be no question about their wisdom, for it is part of the effect of a refrigerator to draw the moisture out of uncovered food."

"But the dryness and the tainting of one food by another are easily avoided by the use of covered receptacles which may be ordinary basins with saucers over them, or the specially designed glass containers which are used by 54% of users—the percentage is much higher in the larger centers where they are more easily obtained."

ON ICE-MAKING

Question 5 investigated the "ice" making aspects of home refrigeration. It showed that 81% of users

enjoyed iced drinks but only 76% made ice cream. Chilled sweets, however, enjoy great popularity and they are made by 91% of users. "There is a certain knack about making ice cream in a refrigerator, but that is quite easy to acquire."

ON THE COLD COOKERY BOOK

Question 6 provided the big surprise of the inquiry. It was "Do you use the Cold Cookery Book" and only 52% said "Yes." "It is sad to think that these practical and beautifully printed handbooks which are sent out with every new electric refrigerator are only used in half the homes they enter."

ON CHILDREN AND INVALIDS

Question 7 did not bring the sort of information which can be summarized by a percentage figure. It sought information about the usefulness of a refrigerator in preparing food for young children and invalids, and many replies simply stated that there were no children or invalids in the home.

"Actually, an electric refrigerator is very useful for these purposes. Many infantile health troubles are due to milk which has become tainted through being kept too long, while a supply of ice can be invaluable for emergency use during a serious illness."

ON BUYING IN LARGE QUANTITIES

Question 8 asked about the economy of buying food in larger quantities, made possible through owning a refrigerator. Many users did not answer this question at all, while a few said definitely that they had not been able to save in this way. The final figures showed a moderate majority in favor of this statement, namely 59% for and 41% not answering and against.

On the other hand, no less than 89% stated that their electric refrigerator had saved them money by preventing food from going bad before it was used. "This is the most immediately obvious advantage of the refrigerator not only as an economy, but as a safeguard against the danger of illness due to tainted food."

The next four questions dealt with the mechanical side of electric refrigeration.

ON BREAKDOWNS

Question 9 covered breakdowns and when it is remembered that some of the refrigerators have been in use for 10 years, the results are very favorable. The inquiry showed

that 76% had never been stopped for even the slightest defect, while 93% had never been stopped for a serious defect.

The great advantage in refrigerator construction which has taken place in recent years makes it certain that a refrigerator installed today has much more than a 93% chance of working for 10 years or more without serious breakdown."

ON MOTOR HUM

Question 10 asked if the small motor was a source of disturbance. Eighty-five per cent replied definitely that it was not, while of the remaining, the majority agreed that the "hum" was only slight.

ON ELECTRICAL INTERFERENCE

Question 11 investigated a matter which has been the subject of much argument—the possibility of the electric motor of the refrigerator causing radio interference.

"There is no question that in the early days of radio, when the crystal set gave way to the valve, all sorts of things caused interference. After all, radio was unknown territory and pioneers had to face and master many new problems, including that of interference."

"It is a very rare thing for a modern refrigerator to transgress in this way. In spite of the fact that this questionnaire covers machines as old as 10 years, 90% of users agreed that they had no interference at all, while the majority of the others heard nothing more than a slight click when the motor started or stopped."

ON COSTS

Question 12 covered the cost of running an electric refrigerator, and 89% agreed that this was negligible. The remainder consisted mainly of people who had no standard of comparison, owing to their having had their refrigerators ever since they went into their present homes, or through living in flats where the cost of electricity consumed is included in the fixed rent.

ON FAMILIES

Question 13 produced some interesting information on the size of families. It asked "For how many people do you usually cater?" and here is the result.

Number of persons catered for	Number of families
1	1
2	45
3	81
4	103
5	53
6	50
7 and over	35

ON SIZE OF REFRIGERATOR

Question 14—"Is your refrigerator large enough?" Ninety-three per cent said "Yes," a few didn't answer and about half a dozen said "No." "Refrigerators are so well planned that even the smallest of them will hold a surprisingly large amount of food."

"At the same time it is sound policy to buy one slightly larger than seems necessary, in order to have a little margin of space available for special occasions."

ON LOCATION

Question 15 brought some interesting information about where people put their refrigerators. "An analysis of these answers would not

Best Letter Writer Wins G-E Kitchen



Miss Margaret Moriarty, winner of the \$1,000 kitchen in the contest conducted by R. Cooper Jr., Inc., Chicago G-E distributor, for the best 50-word letter on "Why I Want to Own a General Electric Kitchen," receives her award from Lane K. Newberry of Barron G. Collier Corp., with R. T. Cragg, advertising manager (left), and W. H. Leahy, kitchen department manager for Cooper, as witnesses.

\$1,000 G-E Kitchen Prize Won By Chicago Woman

CHICAGO—A \$1,000 General Electric kitchen was grand prize for an essay or letter contest held from April 1 through May 31 by R. Cooper Jr., Inc., G-E distributor in this territory.

The distributorship, in cooperation with the Barron G. Collier Corp., car card advertising concern, started off the campaign with a double-space teaser advertisement in all Chicago street cars telling the people to "Watch This Space."

Later, another double-sized card was placed in all cars. This card explained that a \$1,000 General Electric kitchen would be given free to the person submitting the best letter of 50 words or less on the subject: "Why I Want to Own a General Electric Kitchen."

It also stated that entry blanks could be obtained at R. Cooper Jr. Inc., G-E dealers, Commonwealth Edison shops, Walgreen drug stores, and A. & P. markets.

In the same cars, another double-space card advertised: "America's Kitchens Are Going G-E—Save More in More Ways." And still another card restated the contest. An arrow ran from this card to the "Take One" box, in which a quantity of entry blanks were placed.

In addition to all this, a radio program known as "Car Card Carnival," over station WENR (Chicago) made spot announcements of the contest twice daily for six weeks.

The kitchen to be awarded the winner was placed on display in the main showroom of Commonwealth Edison Co.

Every G-E dealer was furnished with a large double window banner on the contest, stating that entry blanks were obtainable at his store.

From more than 8,000 essays received, the judges of the contest, R. H. Donnelly Corp., selected Miss Margaret Moriarty of Chicago as the winner.

The winner resides with her mother and brother in a small cottage which they own, and already has made plans for remodeling the kitchen to make room for the equipment which she won. The prize kitchen consisted of a refrigerator, range, dishwasher, garbage disposal unit, and ventilating fan, as well as steel cupboards and cabinets.

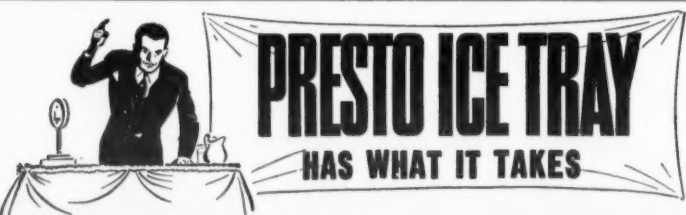
Presentation of the award took place in the showroom of R. Cooper Jr. Inc.

Dayton V-BELTS

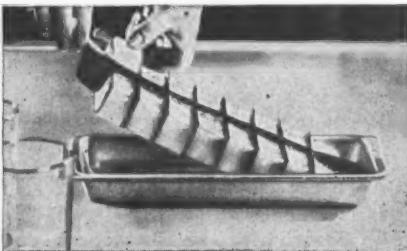
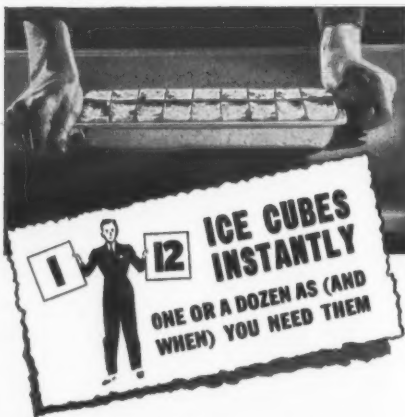
Silent, vibrationless, dependable, long-lasting. Powerful grip prevents slippage. A nearby distributor carries a complete stock for appliances and machines.

THE DAYTON RUBBER MFG. CO., DAYTON, OHIO

World's Largest Manufacturer of V-Belts



PRESTO ICE TRAY
HAS WHAT IT TAKES



and dry, without disturbing the others. No fuss! No bother! No waste!

In less time than it takes to tell, your salesman can demonstrate conclusively how only the Magic Finish Presto Tray with Rubber Grid gives all the advantages of a fast-freezing metal tray plus all the conveniences of a rubber grid.

If you have not already done so—be sure and insist that your new refrigerator come factory-equipped with Magic Finish Presto Ice Trays.

INLAND MANUFACTURING DIVISION
General Motors Corporation Dayton, Ohio

There is no doubt about it—the greatest need for ice cubes is on those frequent daily occasions when one, two, or three persons want a few ice cubes in a hurry. And only Presto Tray with Rubber Grid has what it takes to give one or a dozen cubes instantly, full-sized, cold

WHEN A FEW ICE CUBES ARE PLENTY... DON'T RAID A TRAYFUL... USE

PRESTO ICE TRAY with Rubber Grid

The difference in REMPE FIN COILS

—is the fact that they are made to precision standards without inside wrinkles, buckles, or other capacity-decreasing obstructions.

They are tested to 400 lb. air pressure, thoroughly dehydrated and then sealed before shipment. Thus, we eliminate leakage or condensation troubles, and make satisfaction certain. Write for data—

Ask **REMPE**

REMPE COMPANY
340 N. SACRAMENTO BLVD., CHICAGO

MASTERCRAFT
ADJUSTABLE PAD AND CARRYING HARNESS

The most efficient and economical equipment made for handling refrigerators safely and without scratching or marring. Pad is separate from harness and both adjustable to all styles and sizes of cabinets. Efficient, sturdy, easily and quickly applied. Name of refrigerator attractively lettered on pad without charge.

Adjustable Pad, \$9.50 each
Adjustable Harness, \$6.00 each f.o.b. Chicago.

Write for 1938 folder and prices on pads for refrigerators, washers, ironers, ranges, radios, etc.

Pat. Appl'd for

BEARSE MANUFACTURING CO.
3815-3825 Cortland Street, Chicago, Illinois

THE COLD CANVASS

By B. T. Umore

(Concluded from Page 1, Column 1)

Cardinals (who is in third place), and Joe has been considered for the last few years probably the best hitter in both leagues.

Take pitching. First of all, there's Johnny Vander Miracle, the double-no-hit boy. There's the effective Derringer. There's Bucky Walters, recently purchased from Philadelphia. And the ailing Lee Grissom, last year one of the best pitchers in the majors, is about over his ill health, and will be back in there pitching within a fortnight.

It's going to take a lot of baseball to keep Crosley's Reds out of first place and the World Series. And if Cleveland should win the American League championship, as they appear likely to do, Ohio would turn into a bigger bedlam than a dozen simultaneous American Legion conventions.

...

John Patterson

Old B.T.U. has long been a collector of yarns about John Patterson, the dynamic genius who, as president and founder of the National Cash Register Co., invented the art of specialty selling.

Jack Crossin, Kelvinator regional manager in the Detroit area, was a pupil at St. Mary's school in Dayton during Patterson's heyday.

St. Mary's was just a hop-skip-and-jump from Patterson's headquarters, and occasionally he would come across the way to address the students.

His talks were very entertaining. Mr. Crossin recalls, and they were always built on the same theme:

"There is no substitute for hard work."

Don't get it into your heads, Patterson would advise the kids, that you have to be spectacular to be successful. The spectacular successes too often crack up. Work and then work some more, if you want to get ahead.

...

Like Henry Ford

H. C. Patterson (no relation of John), was a pupil of the same St. Mary's school along with Mr. Crossin. The former is now Nash-Kelvinator regional manager in the Chicago territory.

Both men note many similarities between John Patterson and Henry Ford.

One of them is that Patterson, like Ford, believed in hiring convicts, cripples, and outcasts.

Industry has a duty toward men, Patterson used to insist. Not only must we make real men out of good material, but we must help rehabilitate the unfortunates, those who for various reasons have become the untouchables of our social and economic system.

...

Rubber Stamp Letter

Gentlemen:

We beg to advise you, and wish to state

That yours has arrived of recent date.

We have it before us, its contents noted;

Herewith enclosed are the prices quoted.

Attached you will find, as per your request,

The sample you wanted; and we would suggest

Regarding the matter and due to the fact

That up to this moment your order we've lacked,

We hope you will not delay it unduly,

And we beg to remain,

Yours very truly,

BRO. MIDE FRASER

(From Smooth Sailing Letters, by L. E. Frailey: Prentice-Hall, Inc., 70 Fifth Ave., 1938, \$2.00.)

Refrigerator Exports Gained All Around

(Concluded from Page 1, Column 3)

22,244 in 1936. Canada was second, with 14,071 units compared with 13,698 in 1936; and United Kingdom, high in 1936 with 33,966 units, dropped to 13,514 last year.

Brazil was next, with 12,291 units compared with 11,520 in 1936; France fifth, with 11,893 units against 8,664 in the preceding year; and Mexico and Cuba followed with totals of 7,325 and 6,842 units in 1937, respectively, after 1936 totals of 4,935 and 3,982.

In the commercial refrigerator export field, which includes units up to 1 ton, United Kingdom was far and away the leader with a total of 10,765 units compared with 6,230 in 1936. France was next, with imports of 3,478 units as against 3,847 in 1936; and Canada, with 1,825 units, Argentina, with 1,684 units, and Union of South Africa, with 1,303 units, followed in that order.

Leader in purchases of U. S. refrigerator parts was Canada, with imports valued at \$1,152,795 compared with \$938,962 in 1936. United Kingdom, leader of this class in 1936 with \$1,317,629, was second last year with \$928,012. France was third, with imports valued at \$549,043, and Argentina fourth, with \$508,989. Sales to France in 1936 totaled \$481,727, while Argentina's total for that year was \$276,183.

Union of South Africa had U. S. parts imports for last year totaling \$263,594, and Sweden had imports of \$250,366. South Africa's total for 1936 in this division was \$306,652, and Sweden's, \$133,060.

Hearn's Store Offers \$20 Flat Trade-In

NEW YORK CITY—In what it advertised as "the greatest scoop in refrigerator history," Hearn's department store last week launched a sales drive offering a flat \$20 trade-in allowance on used models of either ice or mechanical refrigerators toward the purchase of 1937 Williams Ice-O-Matic units.

With the \$20 allowance deducted, the models were priced as follows: 4.3 cu. ft., \$69; 5.4 cu. ft., \$89; 6.2 cu. ft., \$109.

The store advertised that it had "30 carloads" of refrigerators for sale at the advertised prices.

No attempt will be made to dispose of used refrigerators taken in trade at the sale terms, it is understood, since store officials expect that most of these will consist of ice refrigerators which have been used for several years and are ready for retirement.

First few days of the sale, according to reports, resulted in between 250 and 400 unit sales in the three Hearn stores. About 100 sales were said to have been made last Tuesday, the day before the actual opening of the sale, when large-size advertisements were run in most metropolitan newspapers.

Anticipating a large response to the campaign, the Hearn management had recruited extra salesmen from its furniture and rug departments to be sent onto the appliance department floor on call. Few of the extra salesmen were needed, however, it is reported.

The store's advertisement appealed to apartment house owners and tenants, stressing the economy of replacing old and inefficient refrigerating equipment.

"Now you can get a Williams 1937 Ice-O-Matic at approximately wholesale factory price—30 carloads—the most sensational prices on record for this world-famous electric refrigerator," the advertisement read.

Easy payments and a "five-year protection plan" also were featured in the newspaper copy. Various models were presented in the advertisement as follows:

4.3-cu. ft. model, "list price \$139.50, sales price \$89, less trade-in of \$20, you pay \$69"; 5.4-cu. ft. model, "list price \$163, sales price \$109, less trade-in, you pay \$89"; 6.2-cu. ft. model, "list price \$205, sales price \$129, less trade-in, you pay \$109."

Customers who are not fortified with something to "trade-in" are able to buy units at the "less trade-in" prices, according to shoppers' reports to competitive buyers.

Frankel Handles Sterilamp Sales In Boston Area

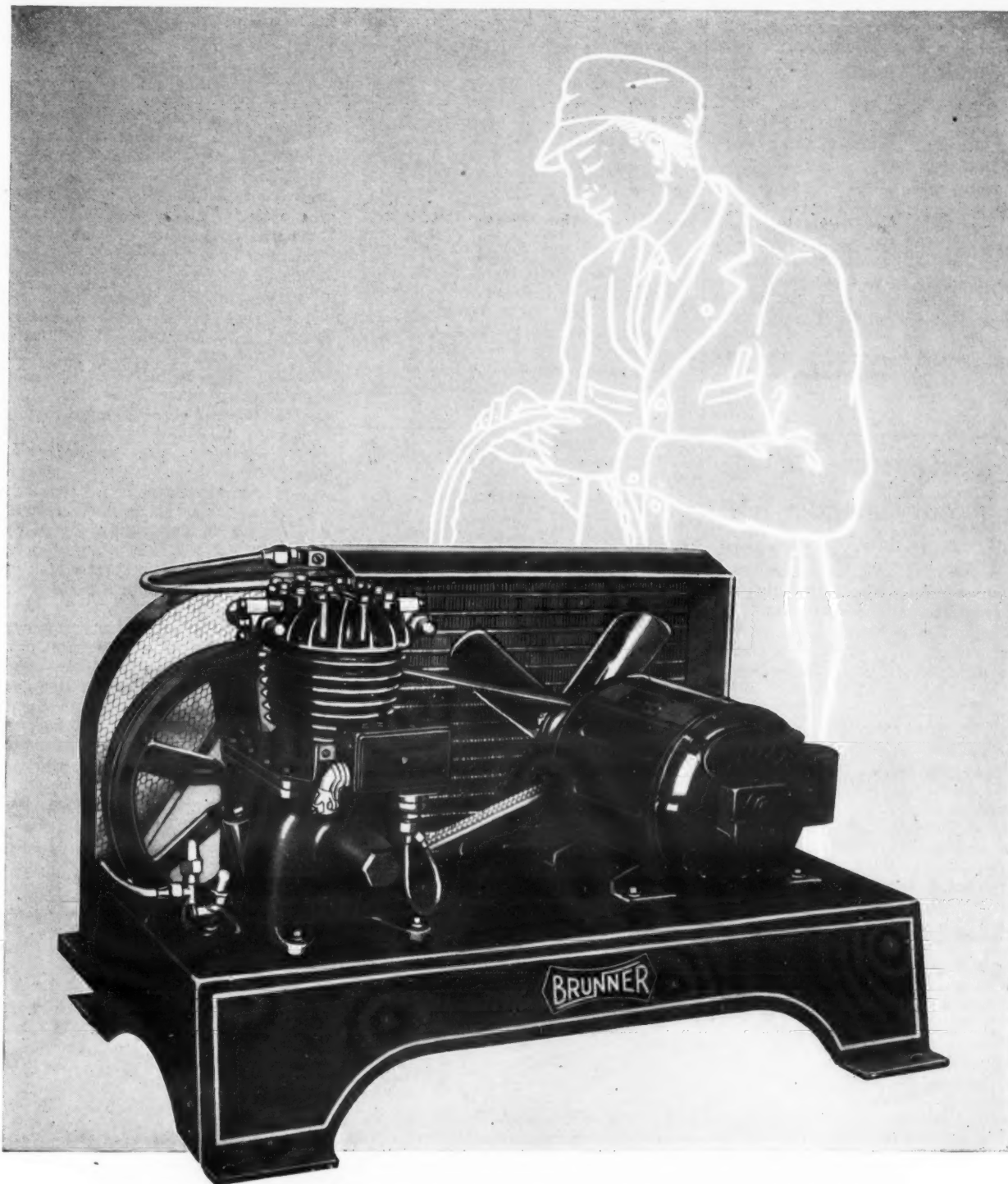
SPRINGFIELD, Mass. — A. E. Snyder, executive sales manager of Westinghouse Electric & Mfg. Co., announces the appointment of Adolph Frankel as merchandising manager. Mr. Frankel is opening temporary headquarters at 10 High St., Boston, where he will establish the first regional field office for handling the marketing of the new "Sterilamp."

Fors Named Airtemp Vice President In Charge of Manufacturing; Wyld Heads Engineering

(Concluded from Page 1, Column 2)
Chrysler Corp., where he had been in charge of plant supervision work for several years. Prior to joining Chrysler, he was general works manager of Continental Corp., exercising general supervision over all of the firm's manufacturing operations in Detroit, Grand Rapids, and Muskegon, Mich.

During the past year, Mr. Fors supervised the installation of Airtemp's straight-line production methods, which are said to have cost \$500,000.

Prior to coming to Airtemp, Mr. Wyld was development engineer for York Ice Machinery Corp. He started his career with De La Vergne Machinery Corp.



YOU'LL FIND DOLLAR-SAVING EXTRAS THROUGHOUT THE BRUNNER DESIGN

Especially at points of stress where mechanical fatigue so frequently takes its toll—there's where Brunner **extras** do their important job... Bronze bearings throughout protect against premature wear. The motor is especially designed with high starting torque. Oversize belting affords greater serviceability. All castings are heavier-than-average. Diamond bored centerless ground pistons insure extra quietness and longer life. Condensers of large prime surface, shrouded to direct air flow, insure maximum refrigerating efficiency. Yes, it's special features like these that put Brunner "out in front" ... Want full details? Write for catalog listing the whole range of Brunner Refrigerating and Air Conditioning equipment, air and water cooled units from ¼ to 15 H. P. Brunner Manufacturing Company, Utica, N. Y., U. S. A.

IT'S **BRUNNER** FOR *economical* SERVICE

Commercial Refrigeration

How Refrigeration Cuts Operating Costs Told By Wisconsin Fur Farm Owners

ELDORADO, Wis. — Commercial refrigeration is assisting the silver fox industry here by making it possible to store cheap meat over long periods of time, assuring a well balanced diet for the fur-bearing animals.

Thousands of silver foxes, black foxes, minks, and fitches are raised in this section of the country each year, and in other parts of Wisconsin, Minnesota, North and South Dakota, and Michigan. It is a lucrative, but speculative occupation.

Tons of meat are required to turn the young pups into sleek, well groomed, well formed animals. The first requisite of a successful fur farm is cheap meat in large quantities.

In the past, the fox farmer has been able to pick up old horses, which are slaughtered and fed to the foxes, at almost any season of the year.

Recent years have developed a shortage in the supply of horse meat, and animals are not available at all times as they were formerly, the fur farmers pointed out.

Refrigeration engineers have shown the fur farmer how he can store ground up horse meat in a frozen state, and have it on hand at all seasons of the year. The idea has taken hold, and today the fox farm is a new market for commercial refrigeration.

A. Gruett, owner of the Gruett Silver Fox Ranch here, states that the operating cost of his farm has been materially reduced by freezing fresh killed horses as they are received during hot weather, and storing them until the meat is needed for feed.

The Gruett ranch employs a 2-hp. York machine for the refrigerated storage of meat.

7 Refrigerated Trailers Used on Mountain Run

SAN FRANCISCO — A seventh 16-ton refrigerated semi-trailer truck cooled by a Baker refrigerating unit and insulated with a combination of Dry-Zero Sealpad and Blanket has been placed in service by Conyes Freight Lines for the long mountain haul between here and Salt Lake City.

The Baker system is located in the rounded nose of the body, which is equipped with louvers and small doors providing ventilation and easy access.

Six inches of the combined Dry-Zero insulation materials are used in the floor and roof of the trailer body, and 5 inches in the sides and ends.

The 32 x 7 x 7-ft. body is built on an all-aluminum frame lined with veneer, and is capable of holding 16 tons of meat, butter, eggs, and produce at a temperature of 20° F., the operators declare.

Chassis and body were built by Reliance Trailer & Truck Co. here. The four-wheel semi-trailer unit is coupled to a six-wheel Fageol diesel tractor.

One Side of a Walk-In Cooler Is Window For Store In California

COALINGA, Calif. — Commercial salesmen of San Joaquin Power & Light Co. sold B. Motte, a grocer in this hot little desert town, a refrigeration job which combines the advantages of a display case with the roominess of a walk-in cooler so placed that it will attract the attention of passersby.

This job consisted of a walk-in cooler, one window of which serves also as a shop window of the store. People looking into the refrigerator from the street are apt to be impressed by the cool-looking supplies of fresh, crisp foods stored in it. After entering the store, customers can be taken right into the refrigerator to make their purchases, and in this way they may be even more impressed by the contrast between outside heat and the coolness of Mr. Motte's refrigerator.

Thus, by serving as a novel and attractive display and by drawing more customers to the store, this refrigeration job increases Mr. Motte's business, in addition to protecting his perishable foods.

Penn State Tests Show That Agitation of Water In Coolers Gives Faster, More Uniform Cooling

STATE COLLEGE, Pa. — Tests conducted in the farm milk-cooling laboratory here, in which elaborate tests have been conducted with many modern milk coolers employing electric refrigeration, indicate quite definitely that agitation of the cooling water is a necessity if milk is to be cooled rapidly and uniformly, declared Prof. John Nicholas of the agricultural engineering department of Penn State in speaking before the recent Food Preservation Conference here.

Principal requirements of a farm electric milk cooler, according to Prof. Nicholas, are the following: (1) it should cool the milk rapidly; (2) it should cool the milk uniformly; (3) it should provide water agitation to promote rapidity and uniformity of cooling; (4) all operating features should be automatic.

LARGE GRADIENT

"It was not recognized until recently that a large temperature gradient exists in a can of milk during the cooling," declared Prof. Nicholas. "The agitation of the cooling water produces two important effects; the milk cools more rapidly and more uniformly."

"Milk in a 10-gal. can will cool slowly and non-uniformly if the water is not agitated. The temperature of the milk measured vertically down through the center of a 10-gal. milk can with 10 thermocouples spaced 2 inches apart from top to bottom shows that a large temperature gradient exists."

Prof. Nicholas presented charts showing that most of the cooling in a water-bath type of cooler using agitator is accomplished in the first hour-and-a-half. Without agitation of the water, the milk near the top of the can registered 70° after the 1½ hours, and stayed over the 50° mark for 7½ hours, he said.

IMMERSE UP TO NECK

The tests also have indicated that best results are obtained when the milk cans are immersed up to their neck in the bath, Prof. Nicholas said. He also pointed out that much of the good effect of efficient farm cooling will be lost if the milk warms up too rapidly after cooling, while being transported to a creamery. He advocated the use of jackets on milk cans in transit.

Prof. Nicholas outlined the reason for the need of milk cooling on the farm, and described the development of modern equipment for this purpose as follows:

"Many municipal and state health authorities, in order to insure a safe milk supply, insist that all milk intended for human consumption must be pasteurized. The process of pasteurization is immediately followed by cooling at the point of distribution.

'LITTLE EXCUSE'

"Fayer, however, states, 'Although milk is pasteurized at the point of delivery, little excuse exists for unsound cooling methods' at the point of production—the farm."

"The importance of cooling milk to at least 40° F. soon after it is drawn cannot be over emphasized. Price, Hurd, and Copson have observed that the bacterial content of milk will not increase during the

first 12 to 24 hours when kept in 10-gal. cans in a tank of water at 35 to 40° F.

"Fayer also found that although the cooling of fresh milk to low temperatures is extremely important, the length of time elapsing before the freshly drawn milk is first subjected to the low temperatures is also of prime importance. He has shown experimentally that the so-called bactericidal action is no substitute for prompt cooling.

"Milk processed within several hours after production has its keeping quality reduced if it has not been promptly cooled to a safe keeping temperature, preferably 40° F., at which there is no bacterial multiplication.

CODES INDEFINITE

"The ordinances and codes issued by municipal and state health authorities stipulate that milk should be cooled. However, there is neither entire agreement as to the limit of temperature nor complete knowledge touching details of the methods used to accomplish this end and the codes are rarely definite concerning cooling practice.

"Fayer, who has made the most thorough study of the production of high quality milk as affected by delayed cooling and temperature, concludes that cooling milk immediately to and holding at a temperature of 40° F. or below produce the best results in quality, both present and future."

FIRST REQUIREMENT

"The first requirement of the farm electric milk cooler, therefore, is to cool the fresh milk to 40° F. or lower in the quickest possible time. It should provide rapid and uniform milk cooling.

"The two general methods of cooling milk on the farm are aeration and direct immersion. Aeration is practical for the producer who retails milk directly; or, in certain areas, for a group of producers because the local municipal ordinances stipulate that requirement.

"Aeration is the cooling of milk by allowing it to flow by gravity over the surface cooler through which either cold water or brine is pumped to reduce the temperature. In direct immersion, milk is cooled by immersing the containers in cold water. The latter method is now most commonly used.

ELECTRIC COOLERS

"Since the rapid electrification of the rural areas, the milk-cooling units are driven by electric motors. The farm electric milk cooler consists of the condensing unit and the cabinet. The condensing unit includes the compressor, the electric motor which furnishes the power, an air-cooled condenser, and a liquid receiver.

"The cabinet is an insulated tank which may be factory built or made of concrete by the user. The evaporating coil and the expansion valve are generally considered part of the cabinet but sometimes are an integral part of the condensing units.

COOLERS CLASSIFIED

"Farm electric milk coolers may be classified according to the mounting of the condensing units, the shape and location of the evaporating coils, and method used in providing agitation.

"There are three different ways of mounting the condensing units. The units mounted on top of the cabinet, at the left or right, are self contained and are completely assembled at the factory. A self-contained unit may be centrally located, in which case the evaporating coil also is in the center of the cabinet.

"In many instances it is necessary to locate the unit outside of the milk house so as to conform to regulations. The evaporating coils are

generally located along the inner walls, spirally, and are protected by a rack against possible damage by the milk cans during loading.

"The expanding of the refrigerant to the top or bottom of the coil has certain definite effects on the performance characteristics of the milk cooler. The quantity of water used and its height are equally important.

"When the water in the cabinet is cooled by expanding the refrigerant to the bottom coil, the stratification of the water bath occurs which influences the rate at which milk cools after agitation has stopped."

Unit Simulates Winter Weather For Studies Of Plant Injuries

DURHAM, N. H. — Refrigerating equipment has proved valuable in tests of the effects of winter injury upon plant structures which are being carried on at the Agricultural Experiment Station of the University of New Hampshire by G. F. Potter, horticulturist.

As both the rate of temperature fall and the final temperature reached have an important bearing on the injuries to plant tissues by cold, it was necessary to design test apparatus which would control both factors.

Plant tissues are tested in a freezing chamber which is capable of temperatures to -40° F., and is insulated with 8 to 10 inches of granulated cork.

COILS SPIRALLED

The chamber is cooled by a ½-hp. York self-contained refrigeration unit. Freon is used as the refrigerant. Expansion coils are arranged spirally against the inside walls of a cylindrical chamber. To insure uniform temperatures in different parts of the chamber, and to prevent difficulties due to radiation, an inner metal cylinder 26 inches long and 20 inches in diameter is suspended in the center of the chamber. This is lined with ½-inch sheet cork.

Driven by a fan at the rear, the air passes through the inner cylinder, and flows back past the refrigeration coils. All tissues are frozen within the inner cylinder. An object suspended in the air near the refrigeration coils, and without a baffle between, would rapidly radiate heat to the coil, and on the exposed side would become much colder than the air. Within the cork-lined cylinder, radiation is eliminated and the tissues are cooled only by the current of air.

SPECIAL CONTROLS

Temperature in the chamber is held to very close limits by means of a special control using an aluminum tube, a ¾-inch rod of Nilvar, a micro-lamp, and a photo-electric cell. Because of the sensitivity of the control, an electric clock keeps the compressor in operation for three minutes each time it is turned on.

High Quality Necessary In Frozen Foods Field Max Waterman Says

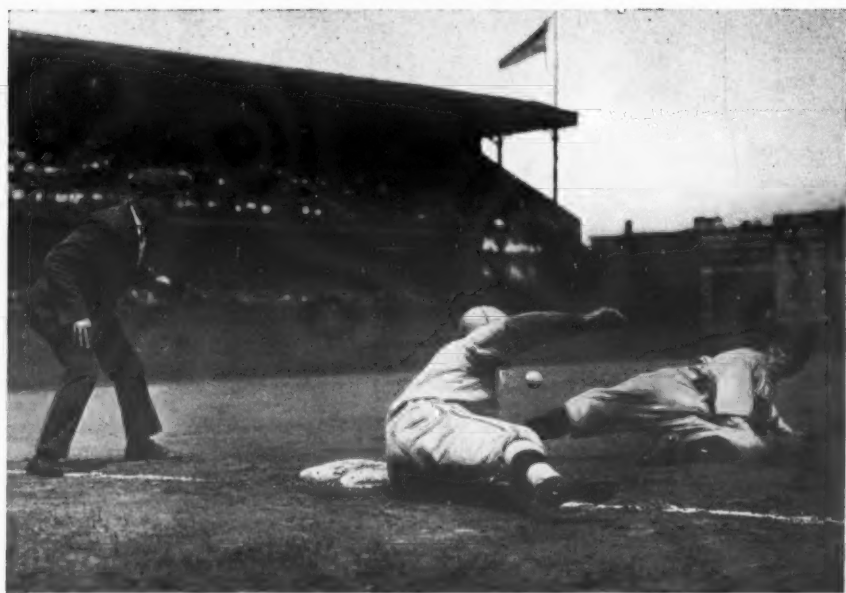
NEW YORK CITY — Max Waterman, president of Honor Brand Frosted Foods Corp., issued a plea here last week for qualitative as well as quantitative standards for frosted food processors in every branch of the industry. Mr. Waterman has been urging organization of a Frozen Foods Institute to set standards and eliminate unsound practices.

"The failure on the part of a single producer to observe top quality standards reflects on the entire field," he said. "More and more it is becoming strikingly apparent that full laboratory control in every stage of frosted foods production, packaging, distribution, and sale is an essential.

"The country generally has been educated to look for laboratory control in other fields, but particularly in this field should it have the right to expect unrelaxing vigilance, from field to refrigerated cabinet."

For fastest known beverage cooling—

Coltrol
Write for literature
Commercial Coil & Refrig. Co.
457 N. Artesian Ave., Chicago



SAFE?

There's often room for doubt—in a ball game. But there's never any doubt when you specify Virginia Quality Refrigerants. You know you're safe because precision production methods and exacting laboratory control guarantee a product of exceptional purity and uniformity. You're safe because you get unusually prompt delivery from your Virginia dealer whether it's a routine or rush order. And you will find your Virginia dealer able to supply you with any important refrigerants you may need.

For Better Service

VIRGINIA SMELTING CO.
WEST NORFOLK, VIRGINIA
METHYLENE CHLORIDE
V-METH-L
EXTRA DRY ESOTOO



Frozen Malted Machine

"THE DRINK YOU EAT WITH A SPOON"
Refrigeration people are ideally set up to sell and service this unit. Operates on ½ horsepower compressor which you sell to the customer. Chain Stores, Drug Stores, Fountains, Stands, etc., are buying. Very low priced. Write for details.
FROZEN MALTED MACHINE CO., INC.
43 E. 20th Street,
New York, N. Y.

Every facility of Servel's vast factory is available to meet your refrigeration needs, whether large or small.

SERVEL
Refrigeration
Write For Literature
Servel, Inc., Electric
Refrigeration and Air Conditioning Division, Evansville, Ind.

Air Conditioning

Recent Tests At the University of Illinois Show Heat Absorbed & Given off By Building Itself Is Highly Important; Will Probably Alter Estimating Methods

Tests conducted on a 2-ton condensing unit in the Research Residence at the University of Illinois during the summer of 1937 not only prove the feasibility of using small-capacity compressors in residential cooling, but also throw some interesting highlights on the heat absorbing capacity of buildings and the lack of heat equilibrium existing in building walls.

Data obtained in the tests at Urbana are applicable to all types of cooling systems and structures, and should prove of value to engineers engaged in the design of cooling systems for residences and small commercial buildings.

HOT SPRINGS, Va.—Research conducted at the University of Illinois during 1937 conclusively demonstrated the feasibility of installing refrigerating equipment of small capacity in residences, particularly in those cases where the initial cost of installation is a more important factor than the maintenance of ideal indoor conditions in the most severe weather.

Results of tests conducted in the Research Residence were presented by A. P. Kratz, S. Konzo, M. K. Fahenstock, and E. L. Broderick, in a paper entitled "Study of Summer Cooling in the Research Residence Using a Small Capacity Mechanical Condensing Unit," read before the summer meeting of the American Society of Heating & Ventilating Engineers here.

EQUILIBRIUM A FALLACY

During the experiments it was also discovered that the most important factor in any residential cooling load is the heat absorbed and given off by the building itself, and that thermal equilibrium seldom, if ever, exists in the walls of the structure. For this reason, it was pointed

out that this lack of equilibrium "results in changes in the amount of heat transmitted through the wall, so that the calculated values of the heat flowing through the wall at any given time (when used as an index of the heat actually transmitted to the air in the structure) are not only meaningless, but are also misleading."

"Furthermore, under summer conditions the maximum amount of heat transmitted through the inside surface of the wall into the inside of the structure may be less than the maximum heat flow through the wall as calculated from the outdoor and indoor conditions."

TWO SERIES OF TESTS

Two series of tests were conducted in the Research Residence during the summer of 1937. In the first series, cooled air was distributed to the entire building; in the second series, the first floor was conditioned until 6:30 p.m., when the entire capacity of the system was directed to the second floor rooms.

During the tests attic windows were left open for purposes of ventilation, and the sun room was closed off from the balance of the house. Total space cooled amounted to 14,170 cu. ft.

Arrangement of the cooling plant was as follows: the 2-hp. condensing unit was self-contained, and consisted of a water-cooled shell and finned-coil condenser-receiver, and a two-cylinder motor-driven compressor. Freon was used as the refrigerant in a direct-expansion coil placed in a by-pass in the central cold air return duct.

EVAPORATOR SIZE

The evaporator measured 14½ by 20½ inches, having a face area of 2.07 sq. ft. Tubes measured ¾ inches o.d. and were two rows deep. Nominal capacity of the refrigeration cycle was 16,300 B.t.u. per hour, the compressor operating at 255 r.p.m., with return refrigerant temperature of 55° F., inlet water temperature of 59° F., ambient air temperature of 74° F., and an equal air velocity of approximately 479 f.p.m. across the face area.

Controls employed consisted of a thermostatic expansion valve having the thermostatic bulb clamped to the

suction line near the junction with the evaporator; a pressure-operated water control valve; and a room thermostat, located in the hall on the second story. The latter served to start and stop the compressor in accordance with the cooling load required to maintain constant room temperature.

The fan in the forced-air system delivered approximately 1,000 c.f.m. of air when recirculating the air in the house and 2,220 c.f.m. when using outdoor air at night. Heat flow through the walls was measured by two Nicholls heat-flow meters.

BIG LOAD—RUNS STEADY

In the first tests, which cooled the entire residence, the condensing unit was started when the effective temperature rose to 74.5° F. At the start of the test, when the relative humidity indoors was from 60 to 70%, the corresponding dry-bulb temperature was 79° F. However, the heat-absorbing capacity of the unit was so small that when the rooms on both stories were being cooled the plant operated practically continuously until the time when the cooling with night air was started.

In the second series of tests, the condensing unit was operated intermittently, to maintain an effective temperature of 74° on the first floor until 6:30 p.m. Cooling with outdoor air was started when the effective temperature outdoors became equal to the effective temperature inside.

CONDITIONS SATISFACTORY

During the first tests, when the compressor operated almost continuously, the relative humidity in the residence stabilized at about 59%, representing an effective temperature of 74°. While relative humidities maintained with the small capacity condensing unit were 10 to 15% higher than those maintained by a 3-ton system in previous tests, the indoor conditions with the higher humidity were considered entirely satisfactory.

To maintain the same effective temperature with the smaller condensing unit, it was found advisable to maintain an indoor dry-bulb temperature somewhat lower than that maintained with a unit of larger capacity. This fact, together with allowing for a rise in the indoor temperature on hot days, made it advisable to operate the cooling plant from a room thermostat set at approximately 78° F. rather than 80° F.

Differences in the relative humidities obtained were attributed to difference in season, difference in mean coil temperature, and difference in the depth of coils used in the two plants.

OKAY IN 95° WEATHER

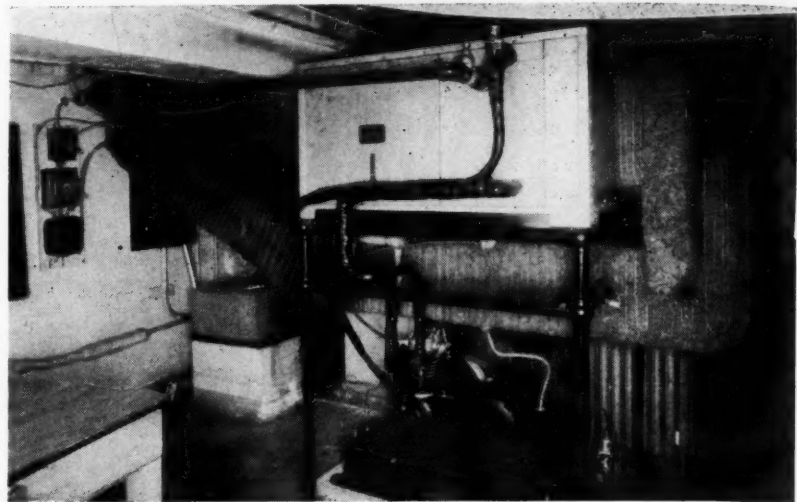
The cooling capacity of 17,300 B.t.u. per hour was found to be sufficient for days in which the maximum outdoor temperature rose to 95° F. and the minimum outdoor temperature during the night preceding did not exceed 71° F. Since the summer was relatively cool, no tests were obtainable under severe weather conditions.

With relation to the weather, the daily median temperature of 83° F. which was exceeded only once during the cooling season of 1937 in Urbana, may be considered as the probable upper limit for the range of application of the small-sized condensing unit, the report states. It is most probable that for daily median temperatures exceeding 83° F., the indoor temperatures would have risen above 80° F., and comfort conditions would not have been entirely satisfactory during the day, it continues.

CALCULATIONS APPEARED OFF

In several of the tests, the cooling plant in use did not absorb heat at the rate indicated by the maximum calculated value of the cooling load. In view of the high rate at which the calculated cooling load increased,

Lovely Ladies Can Now Sniff In Cool Comfort



The exclusive perfume shop of Lenthier, Inc., in New York City (below) found air conditioning desirable for many reasons—to avoid a mingling of odors, to provide a quiet and restful atmosphere for its patrons, and to offset the heat generated by an elaborate lighting system. This somewhat unusual installation was handled by Independent Utilities, Inc., which put in the equipment—including a 5-hp. Merchant & Evans compressor shown at the top.

as compared with the actual heat absorption, the magnitude of the rise in the indoor air temperature that was actually obtained appeared to be extremely small.

The fact that this rise was not greater was attributed to heat absorbed by the building structure and furniture, and not in turn given up to the indoor air.

Calculations made under the tests indicated that the amount of heat absorbed or given up by the Research Residence was 24,344 B.t.u. for each one degree change in indoor air temperature. This total was computed for the building structure alone, and did not include heat absorbed by furniture, floor coverings, light fixtures, books, and equipment.

BUILDING HEAT A FACTOR

Because the heat absorbed, or given off, by the building represents a large proportion of the cooling load, the results emphasize the necessity, particularly where the plant capacity is limited, of starting the cooling plant each day before the indoor temperature has risen above that required for comfort conditions.

If the indoor temperature goes above 80° F., a comparatively high capacity will be required, even on a mild day, to effect a rapid decrease in air temperatures, at a time when the cooling load is increasing, the report indicates.

HEAT IN STRUCTURE

Although these results apply to a larger extent to residential installations, where the occupancy load is small, the effect of heat exchange between the air and the structure should also receive consideration in the case of other types of structures and under other operating conditions, particularly in installations in which

a rapid reduction in the indoor temperature is required.

Results of tests with cooling on the first story during the day and the second story during the night indicated that comfort conditions attained on the first story were slightly more satisfactory than those maintained when the small condensing unit was used to cool the entire residence.

Comfort conditions maintained during the off-period of the plant, however, were subject to improvement, and better conditions would have resulted had the off-periods of the plant been reduced, the report concludes.

CONDITIONS ON BORDERLINE

Conditions attained on the second story were just on the upper border line of comfort, and a larger capacity would have been necessary to produce a rapid reduction in temperature when the capacity of the cooling plant was switched to the upper floor of the residence at 6:30 in the evening.

During the 1937 tests, the fan was operated for 1,756.8 hours at a cost of \$24.13, based on a rate of 3.1 cents per kwh. Total time of operation of the compressor was 199 hours, and the cost of electricity for this purpose was \$8.61. Water used for the condensing unit amounted to 11,961 gallons, and at the prevailing rate of 33 cents per 1,000 gallons the total water cost was \$3.95. Combined cost of both electricity and water for the season was \$36.69.

MODIFY CALCULATIONS

Results of the flow-meter studies proved that heat equilibrium seldom exists in any wall, and that calculated values of heat flowing through the walls at any time must be modified by the amount of heat stored in the wall.

Graphs made in connection with this study demonstrated that late in the afternoon of any hot day, heat stored in the walls of the residence would be lost both to the inside and outside of the building, making calculated values based on equilibrium meaningless.

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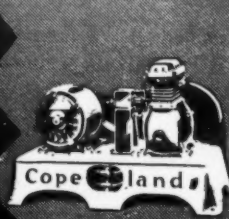
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'The Business Man Also Revolts'

The following article by Charles D. Ammon, president, The Cushman Motor Works, Lincoln, Neb., was published in Dun's Review For June 1938 under the above title.

In an introduction to the article Dun's Review stated: "In answer to Colston E. Warne's 'The Consumer Revolt Against Business' which appeared in the February number, a manufacturer here submits his view of the other side of the question. This is one of a series of articles on subjects of unusual significance to business, presenting the opinions of men whose diverse backgrounds and points of view have created decided, and often conflicting, convictions."

It is reprinted in the News, with permission, because it is so frank and so revealing a statement of the attitude of many a typical individual business man today.

How easy it is for the uninformed to accept the demagogue's picture of the business man as a bloated plutocrat riding to his golf club in a chauffeured limousine while he piles up outrageous profits by underpaying labor and overcharging consumers. "Soak him!" cry the easily misled, and "soak him" again the government does.

Mr. Ammon's plaintive statement is calculated to match the demagogues at their own game.

By Charles D. Ammon, President, The Cushman Motor Works, Lincoln, Neb.

I'm getting tired of the job. In fact, it no longer is a job—it's a pain, almost a nightmare. I'm tired of the unfairness of my consumer, although I can't remain in business without him. He has reached the point where he thinks there is only one side to any transaction—his side. He is now kicking me around worse than they used to kick my dog around.

I have set up a laboratory, and an experimental shop. I employ chemists, engineers, and scientists to discover new comforts, pleasures, and luxuries for the consumer. These cost vast sums to start, and the yearly expense is terrific. I take a chance on the outcome. I gamble that I can make something which will benefit the consumer enough so that he will pay for it.

'TAKES THEM FOR GRANTED'

By such means I lifted his standard of living so far and so fast that it is the wonder and envy of other nations. I make my products so efficiently, and have reduced the price so rapidly, that any man with a spark of ambition can possess and enjoy them.

Then, just as soon as my products become a part of my consumer's life, he takes them for granted. They become a part of his "God-given natural resources." He begins to accuse me of being mean and grasping. Instead of trying to earn them, he puts in hours of time abusing me for not supplying them FREE.

Politicians are elected to office by their abuse of me. Teachers, whom I have supported by my taxes and by my employment of their students, train these students to hate me and to question my honesty, or right of possession, at the same time that they expect employment from me. I am first abused, and then regulated, by every impractical brain-truster and power-mad politician in the country.

DEMAND EXAGGERATION

My consumers have listened to the extravagant promises of politicians, labor leaders, social reformers, and entertainment producers, until when I present my products in simple, truthful language I am laughed at. My consumers demand exaggeration to hold their attention. When I state that my product has limits of value, they leave me and hie themselves to some street-corner faker, or some house-to-house canvasser, who is licensed by the political bodies which my taxes support.

When my customers buy foods, they expect me to claim every vitamin, gland extract, and food value that the fanciful imagination of the medical profession can describe.

TIRED OF DISHONESTY

Led by job-holding bureaucrats, consumers ask that I support, by taxes, theorizing and testing bureaus who think that, without experience, they can write standards and specifications of more value than those I have established by years of business experience and improvement.

I am tired of the service my consumers ask of me, and the unfairness—nay, the actual dishonesty—of their dealings with me. I service my

products, at great expense, while introducing them. I fit them to their uses; I develop new uses. To do this, I am forced to build up expensive sales and service organizations. Then, when all the development is completed, my customers wish to form co-operatives to destroy my organization—co-ops which have never developed either new products, new uses of products, efficient sales methods, or practical service organizations.

My customers ask, and receive, special tax favors for these co-ops, even government financing. They ask that I meet the price of such co-ops, and also extend them credit, while they pay cash to these competitors. They ask that I furnish service, instead of red tape.

ABUSE ADVERTISING

My consumers demand that I tell them of my products by newspaper, magazine, and radio—that I pay, with my advertising, for all their reading, news, and entertainment. Then they feel free to listen to tax-supported bureaucrats rave against the educational and esthetic value of my programs, and abuse the little advertising which I put in with the entertainment.

I am getting tired of supporting, by contributions and taxes, professional welfare workers whose sole aim in life is "bigger and better charities," and greater salaries for themselves, while at the same time they place the blame for their need upon my failure to make the "more abundant life" as free as salvation for every incompetent under their wings. Yet they would not let me do this if I could—it would mean their jobs.

CALLED A MENACE

I am getting tired of supporting, by taxes, a lot of teachers, who, having never had any practical business experience, never having paid any wages, never even having had to produce anything or give any service, in proportion to their salaries, yet feel free to tell my customers, as unassailable gospel truth, what a menace to the general welfare I am, and how I should distribute all the comforts of life, regardless of the willingness of others to give me some adequate service, in return for my efforts.

I am getting considerably tired of my employees. I have furnished labor-saving machinery that has taken the physical drudgery out of their work. I have installed automatic equipment, which has permitted men with comparatively little experience to produce and obtain continually advancing rates of pay, at the same time that the costs of my products have declined. I have tried to educate my men so that they might advance; I have made their working conditions pleasant; I have helped to elevate their social life.

DECRIES DEMAGOGUES

Not only have many of them refused to help in their own advancement, refused to spend any time in study, refused to assist my efforts, but now I find them following strange leaders, with wild promises, mostly based upon hate and class prejudice. I find them beginning to hate me and my family and friends. I find

them demanding that paid, prejudiced outsiders, and political climbers, dictate to me all my relations with my employees and my consumers.

I am tired of every politician riding into office upon his abuse of an economy that makes his office and salary possible. I am tired of him who, while not knowing or caring anything about the actual needs of business, passes restrictive laws that are gradually enslaving me and my employees, lowering their and my standards of living, and causing the cycles of business to be greatly exaggerated, and at the same time using such results as a means still further to control and to handicap me and to regiment my employees.

I am tired of being blamed for unemployment and maldistribution, by these same politicians, who have wrecked business and brought on a depression by political handicaps, both federal and state; who have thrown my employees out of work and destroyed the purchasing power of my customers; who have attempted to repeal the laws of supply and demand; who favor organized voting groups; and who now prevent my doing anything constructive to undo their wrong. They make me feel I can do nothing worth while with my labor or life.

TIRED OF TAXES

I am tired of being blamed for a submerged third, ill-clothed and poorly housed. I have developed unthought-of-products, making an unlimited number of jobs. I have almost abolished the need of the day laborer, and substituted the opportunity for better work. I can't give men ambition—I expect the teachers I hire to do that. But I have made

a place for every individual with ambition, and have created an opportunity for him to progress as far as the tax collectors will permit.

Finally, I am tired of supporting the whole mess by taxes. I spend half my effort, and pay out half my income, to non-producing political drones. This further prevents my industrial progress and the advancement of my employees. I am taxed on what I produce, on what I spend, and on the people I employ, and when it is all over, I cannot leave even the residue to my loved ones, without these squanderers taking the larger part of it.

I love my work. I feel I have done something constructive—have added something to the comforts and happiness of mankind. But no longer can I accomplish much, with such unbearable and unsurmountable handicaps. So even the solace of a day's work well done is denied me. I am tired of it all. If someone will only show me the place on the face of the earth where energy, ambition, and thrift have a chance to accomplish something, I am ready, even at my age, to start there from scratch. Otherwise, I am about ready to sit down in my house by the side of the road, and let the rest of the world go by.

Johnson Service Appoints Stewart Branch Manager

MILWAUKEE—W. O. Stewart, sales engineer for Johnson Service Corp. on the west coast, has recently been appointed manager of the Los Angeles branch, according to an announcement by company officials.

Report Says Dept. Stores Lost on Appliances

NEW YORK CITY—An average loss of 5.5% in the appliance department was sustained by the typical American department store in 1937, it is asserted in the 1937 departmental merchandising and operating results study of the controllers' congress of National Retail Dry Goods Association.

Based on reports of department and specialty stores throughout the country, the survey showed that total sales for 1937 were 5% ahead of the 1936 figure, although the average net profit was 1.6% as compared with 2.6% in the preceding year.

Decline in net profit was due to a higher operating cost, the controllers' congress reported. Heavier social security taxes and expanded payrolls accounted for much of the increased expense, the report showed.

Markdowns averaged 7% to sales in 1937, as compared with 6.6% in 1936.

Nema Refrigeration Offices Moved To New York City

NEW YORK CITY—Headquarters of the Refrigeration Division of National Electrical Manufacturers Association, formerly located in the Penobscot building, Detroit, have been transferred to Nema headquarters at 155 E. 44th St. here. Haldeman Finnie remains as manager of the division, all business of which is being handled here.

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Social Indigestion

PREVIOUS depressions in the United States have been "cured" by the arrival of something new—the railroads, the discovery of oil, the springing up of the steel industry, automobiles, the radio, to name a few. Consequently, some of our most astute industrialists have been led to declare that a new industry would be the best antidote to our financial doldrums.

Back in 1932 and 1933 the soothsayers were picking three new horses for this Moses-like-new-industry race: air conditioning, television, and prefabricated homes. Well, we have all three; but we can't say that any one of them has shown any speed or willingness to lead the pack.

Air Conditioning Progresses Slowly 'Midst Confusion

Air conditioning, to be true, is going ahead. But its pace is disappointing. Utter confusion exists as to methods and channels of distribution. And the public, which welcomed the idea of controllable weather with brass bands and banners flying, hasn't learned whom it can trust in the business.

Prefabricated homes? People have shown total apathy toward them. And television? The patentees, makers, and broadcasters agree that "the time isn't ripe."

Messianic New Industry Has Not Appeared

And so, if a new industry is to come along and hypo the nation into another spending spree, it must be something still aborning in an inventor's head. The fact seems to be that the public is becoming satiated with new miracles of science and production.

This may sound like treason, coming from the business newspaper of the very new refrigeration and air-conditioning industry. And we should hasten to affirm

our belief in the efficacy of the joining of science and mass production to produce higher standards of living.

But one must admit that new things have been coming awfully fast in the last few decades. Man has probably had to adjust himself more to new standards and new conceptions in the last half century than in all the previous centuries of his existence. The result is the moral, social, political, and economic chaos that prevails in the world today.

Public Has Been Led To Expect Miracles

One of the chief troubles, we believe, is that the public has been led to expect miracles.

In the early days, they took the new things and were tickled to death with them, no matter how poorly developed they might be. Telephones that roared, radios that howled and squeaked, automobiles that couldn't cross a county line without breaking down (remember the old refrain: "Get out and get under"; and all the Ford jokes?), uncomfortable trains, unpalatable canned foods—they were taken for what they were worth, and praise Allah.

But these products improved, and along with their improvement came modern advertising. In glowing messages-in-print, the public was led to believe that modern industry was infallible, that perfection had been reached, that our scientists and producers had a ready answer for everything.

People Seem Impatient With Product Evolution

So now the public expects its miracles to be born fully developed from the heads of our inventors, like Minerva from the forehead of Jupiter. It wants perfection all wrapped up, ready to use and no back talk, for nothing down and 50 cents a week.

People put up with flagrantly noisy radios at first, but they will tolerate no distortion in television. They put up with sloppy ice refrigeration, but they howl if air conditioning seems a trifle too cold or fails to cure their rheumatism.

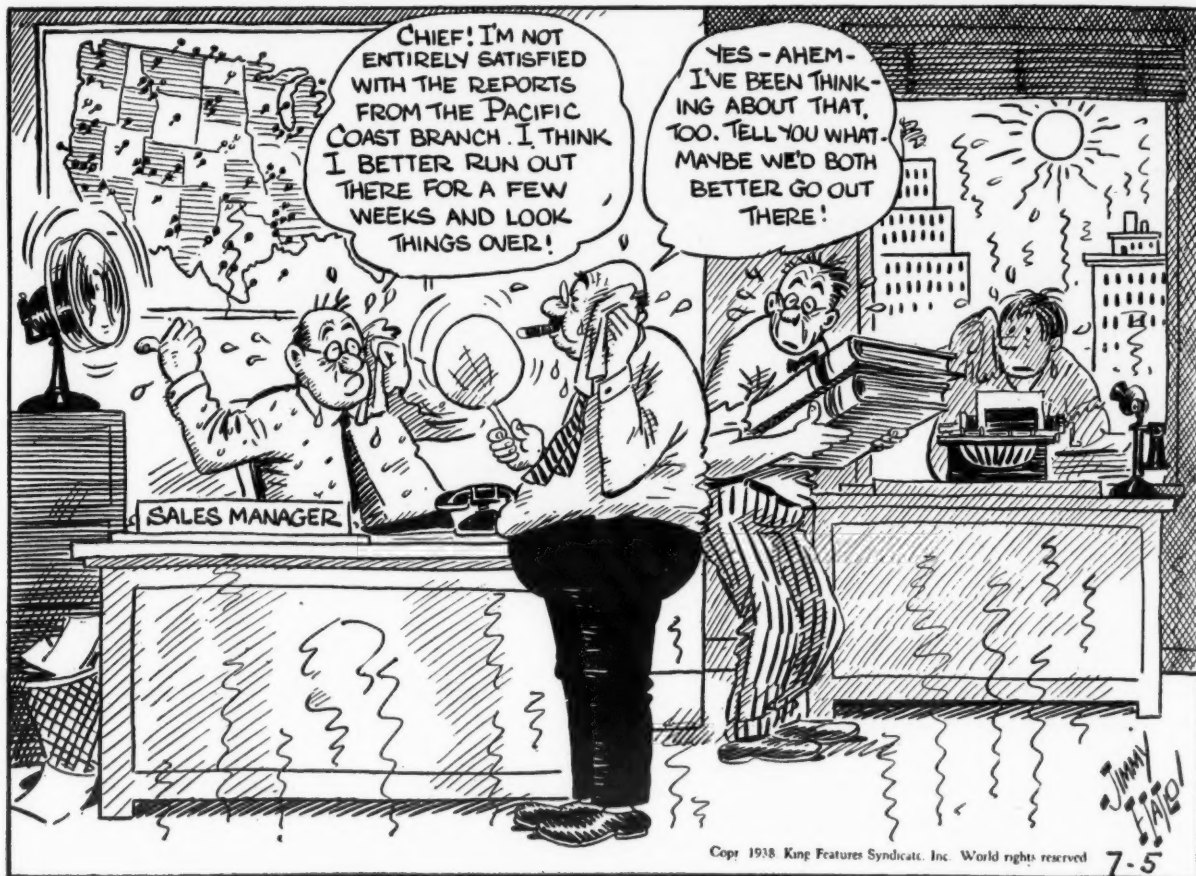
Again, we say that the public is not wholly to blame. Things have come too fast and too furiously. Social and political development and adjustment have lagged far behind invention and production. People have simply been unable to absorb and assimilate such rapid industrial progress—especially in view of the fact that they have had it thrust upon them by high-pressure methods, by advertisers who have claimed perfection and omnipotence.

Industrial Magic Led To Economic Magic

And so it is that when their idols were toppled in 1929, when the captains of finance and industry turned out to be confused, bewildered human beings like themselves after all, they turned to false prophets.

Having lived in an age which could produce the miracles of radio and aviation and electric organs—things which they never understood but simply had to accept—people were too ready to believe in economic magic like the Townsend Plan and Social Credit. If this be an Age of Miracles in industry, why not an Age of Miracles in economics, they reasoned.

They'll Do It Every Time . . . by Jimmy Hatlo



Science and industry have made work easier and softer. And now people want economics and politics to do the same thing—give us the More Abundant Life without working for it.

But there are signs that the public is becoming wiser. Just as they are no longer so eager to accept the new products of industry without question, so they are becoming more canny about economic nostrums.

Critical Appraisal Now Order of Day

Two very important developments are likely to result: industry may have to become more candid and informative in telling its story to the public; and (2) voters may cease taking the eloquent witch doctors and their economic nostrums at face value.

The Age of Miracles, it would seem, is fast dissolving into the Age of Critical Appraisal.

LETTERS

'Specialty Dealer Missing a Bet in Stoker Market'

Holcomb & Hoke Mfg. Co.
1545 Van Buren St.
Indianapolis, Ind.

Editor:

Maybe I'm wrong . . . if I am will someone please put me straight?

I've been calling on and working with appliance dealers ever since there was such an expression used in the industry. During these years I've had them catalogue as enterprising merchandisers of specialty equipment . . . men who had the foresight to pioneer such industries as the radio, washing machine, electric refrigerator, electric range, and many other new fangled gadgets that have come to be household necessities during the past decade.

Naturally, as in any line of endeavor, there have been a good many weak sisters . . . organizations that had no right to put a sign on their door in the first place. But I am not referring to this class of dealer in this discussion.

The appliance dealer who was able to make good . . . the fellow who may have started in a "hole in the wall" location and who fought his way up to a good sizable sales organization only to find himself practically in the clutches of the manufacturer and the finance company, is the dealer to whom these remarks are directed.

Two years ago I started to inventory the possibilities of the appliance dealer in the lines common to his business today. Cut-throat competition was just beginning to make its

appearance to the average good dealer. Manufacturers spent huge sums in advertising and pressed for business to the extent that distributors began franchising anyone with a telephone and enough money to buy a sample of the product offered for sale. Finance companies eagerly planned the same class of dealer and spread his meager investment so that he could put a whole line of appliances on his floor for the actual cash investment he would have had to make to purchase one item.

The natural result is that the appliance business as a whole has become so demoralized that many good legitimate dealers have been forced to quit business, or at least curtail their operations to such an extent that they are operating practically a one man "carry your lunch" business with the excuse that it is all due to the depression and they are waiting for business to pick up.

It is true that manufacturers, distributors, and finance companies have had a lot to do with this condition. But it is also true that these same dealers who had the foresight to pioneer this business to a point where it was plenty remunerative have either become exceedingly lazy or have lost a lot of their foresight that made them outstanding merchandisers of home appliances.

Today, as never before, there is a real opportunity for the aggressive appliance dealer to really cash in. What with the advent of domestic air conditioning, stokers, oil burners, gas burners, and the awakening of the home owner to the realization that he has grossly underestimated the importance of his heating plant, and cooling comfort in his own home, there is a market in the offing that dims in importance all other appliances combined.

Yet right now, many's the good dealer who is sleeping at the post. Many's the dealer who says its the plumber's or furnace man's market.

Nuts! Its a market that every good appliance dealer with a sales organization should already be in.

Specialty salesmen were always hard to get. They're above normal . . . that's the reason they can sell high-priced equipment. Yet many good dealers today are trying to keep their salesmen sold that there is nothing new under the sun and that they've got to continue the same old line of cut-throat competition that has existed in the appliance business for the past few years.

It doesn't require a master mind to sell stokers and domestic air conditioning, yet it requires brains enough to keep a lot of the shysters out.

Any dealer who has been able to weather the storm and hold a sales organization together can train his men and keep them from slow starvation.

Many factories in this type of business now have competent representatives in the field who are able to cooperate along this line. Schools are carried on for the asking and salesmen are brought together and a new enthusiasm is created which will give many a good salesman a new lease on life. That happens to be my job at the present moment and I can sincerely say that many good dealers with whom I have come in contact who were losing both organization and money, are now forging ahead, adding salesmen, making it possible for those they now have to make

money, and adding dollars in profit to their business.

Nearly every good dealer has a service and maintenance organization to install and service the equipment he now sells. These same men can be trained very easily to handle the installation and service of domestic stokers, etc. Furthermore, in the metropolitan centers, many distributors are set up to handle this part of the transaction completely, leaving only the selling job up to the dealer with full profits available.

One of the major causes of competitive price wars in the major appliance business is the degree of saturation of the market in these lines. The same customers who have already purchased refrigerators, electric stoves, etc., are the potential customers for stokers, gas burners, air conditioning, etc. For instance, with stokers, the industry with which I am affiliated, the market is less than 5% saturated. That means that all the dealer has to do is to go to his file of customers who are already on his books and he will find more prospects than he will be able to take care of if he properly instructs his salesmen to create prospects out of these customers in other lines.

Financing of this type of equipment is easier than anything the appliance dealer now has to offer. No down payments, longer terms, less carrying charge, and best of all, absolutely non-recourse financing are now available for the dealer under the Federal Housing Administration plan. This means that the dealer doesn't add one dollar to his contingent liabilities when he enters this type of business.

Its time for the appliance dealer to wake up and live, and take advantage of this tremendous market that's just waiting to be "took."

G. R. WEST

Likes Sales Manual

Albany Garage Co.
Howard, Lodge, William & Beaver Sts.
Albany, N. Y.

Editor:

We liked "Appliance Selling Today" so well that we ordered four additional copies. We have been subscribers to your refrigeration magazine for several years, one subscription being in our name and one in the name of our wholesale manager.

STEPHEN BROWN,
President

'Excellent'—

Rex Cole, Inc.
25-11 Hunters Point Ave.
Long Island City, N. Y.

Sirs:

We agree with you that "Appliance Selling Today" is an excellent collection of sales ideas, promotion and operating methods.

R. STEVENSON,
Vice President and General Manager

Manuals Profitable

31-75 29th St.
Astoria, Long Island, N. Y.

Sirs:

Could you kindly forward me your Refrigeration Service Manual No. 1, as I have Manuals Nos. 2, 3, 4. All the information I have already obtained from them has paid for them twice over. Enclosing my dollar I am,

WARREN BENES

Air Conditioning

Since Great Percentage of Shop Owners Lease Premises, They Look With New Interest on Movable Equipment

Editor's Note: This is the third of a series of articles by Mr. Smith analyzing both buying and selling trends in air conditioning.

In this article he tells why air-conditioning equipment that is packaged, or at least easy to move, will get attention from proprietors of various types of businesses who are considering the purchase of air conditioning.

By Mac Smith, Detroit Merchandising Counselor

MOST of the commercial air-conditioning installations sold today are being bought by the people who own the business that profits from it—not the building owners who have the space to rent.

There are exceptions, of course—office buildings (particularly in the Southern and Southwest sections of the country), theaters, a few very modern and usually ritzy shopping center buildings and arcades. However, the run-of-mine air-conditioning business in the "Main Street Market" is done with the owners of the business. A recent survey covering 1,283 retail establishments in small towns and cities, from New England to the midwest, uncovered the fact that 67% of those who have purchased air conditioning don't own the buildings in which it was installed.

This is not the way many sales managers expected the business to go when they started selling year-around air-conditioning service as the logical successor to winter-time heating. It may not be the way air conditioning will be sold several years hence, as this new comfort development comes more and more to be recognized as a necessity in retail establishments. But it's the situation today and it's today's concern of anybody who has air conditioning to sell.

MORE THAN ¾ RENT

Today's buyer, two times out of three, is a renter. And, knowing that he's a renter, we know quite a few things about him before we ever see him.

He may stay in his present location 20 years or more—long enough to give him time to amortize any piece of equipment that he puts into it. However, he doesn't always figure that way. The most common comment to our investigator who set out to learn the attitude of air-conditioning prospects, second only to the "rubber stamp" comment about air conditioning costing so much, was that the prospect didn't own the building he occupied and that he didn't feel like installing anything he'd have to leave behind when he moved for the benefit of his successor who might logically be expected to be a competitor.

If the building owner would put it in, his tenant would appreciate it. The building owner usually won't put it in, however, and the owner has a

lot of good logical reasons for not doing so, some of which he mentions, and others that haven't occurred to him yet.

First of all his property is leased and working for him. It's paying him a return, and so long as that continues he doesn't see why he should increase his investment for what he considers a doubtful increase in revenue. Second, he doesn't have enough competition from air-conditioned buildings to make it likely that his tenants will be lured away from him.

The third reason which has come up where buildings are in the hands of mortgage companies, sounds like a travesty, but it's a sound business reason just the same. Where this kind of a building owner controls a big proportion of the rentable space in a business district, he's pretty sure to keep on getting revenue from a tenant wherever he moves, so why should he put in air conditioning to try to keep him in any one spot?

REQUIREMENTS VARY

Another logical reason why the owner of the business, and not the owner of the building, should buy the air conditioning, is because different occupants of the same space set up entirely different air-conditioning requirements.

A restaurant with a high occupancy factor and a lot of heat-generating equipment, and with cooking odors to be removed, will need more air changes and more cooling capacity than a haberdashery shop that might logically be the next tenant in the same space.

A beauty shop, with hair dryers pouring heat into the atmosphere, presents a bigger load problem than a stationery store. A grocery store will have more customer traffic through the doors than a dress shop. If ever a building owner starts thinking along these lines he's apt to decide pretty quick that air conditioning should be up to the tenant.

The records show that it's the tenant who is buying it, too. Somebody has broken under his skin with a sales argument that cracked his defenses and gave him what he wanted. And that thing was portability—air-conditioning systems that the tenant could take along with him when he moved. Or, to be brutally frank about it—air-conditioning systems that the tenant wouldn't have to leave behind!

Condensing units standing on skids in the basement, or in a back room where they're conveniently close to water, sewer, and power, is one answer to this problem of portability. Air conditioners that stand on the floor or hang from the ceiling are another.

KEEP IT MOVABLE

The trick is to have nothing in the system that becomes a part of the building excepting a couple of refrigerant lines and a drain tube or two.

Such installations should be designed with little or no installed ductwork, or alterations to make air conditioning possible; with little permanent improvement to be left behind for the benefit of the landlord or the next tenant. (That's music in the ears of the prospect who rents his quarters.) The dealers who are talking about air-conditioning systems that don't have to be built-in report that this selling approach works.

The outstanding example of this kind of equipment, introduced only a year ago, is the completely self-contained store cooling unit, a piece of equipment almost as portable as a reach-in refrigerator or a show case. Notwithstanding a sales showing that may have been slightly disappointing to some, this type of equipment has done big things for the air-conditioning industry.

STIRS PROSPECT'S INTEREST

A survey among 72 dealers who sold this equipment last summer revealed almost unanimous agreement that the news of portable air-conditioning equipment for stores created a lot of new interest and many new prospects.

People realized for the first time that air conditioning could be had without a built-in system. They discovered that it didn't take an engineer to operate a simple installation, that they didn't have to shut down their places of business to have one installed, that they didn't have to leave everything behind if they moved. And they received the air-conditioning salesman with a new, open-minded attitude.

This year nearly every manufacturer of packaged air-conditioning equipment is introducing similar units. Some of them merely had to build cabinets around equipment they have had in the line for years. Some have cut their margins to bring the price down to an appealing figure. Some have admitted that they don't

expect to make much profit on these self-contained store units. But they need them in the line, to open doors on the appeal that here is air-conditioning equipment you don't have to leave behind if you move to another location.

SELL 'MOVABILITY'

They may open a lot of doors of prospects who can't be served most economically with this type of equipment. That's their big value. That's the cue for any air-conditioning man with any kind of equipment to sell. The salesman who talks portability or "movability" talks the language that interests the Main Street prospects these days!

The reason is that such prospects are renters. Table 1 gives the facts as they exist today in the City of Detroit. The pattern is typical of the situation across the country. The big majority of retail establishments, representing the most active and fastest-developing market for air conditioning, lease the quarters they occupy.

Table 1—Tenants Vs. Owners

Restaurants	90% lease
Women's Wear Shops	99% lease
Men's Wear Shops	99% lease
Shoe Stores	99% lease
Beauty Shops	95% lease
Confectioneries	83% lease
Drug Stores	92% lease

Estimating Sheets For Air-Conditioning Jobs Offered By Fedders

BUFFALO—Complete estimating sheets for use in figuring the cooling and heating loads for air conditioning are now being made available to the industry as a service of Fedders Mfg. Co.

These sheets cover the essential points necessary for specifying the correct equipment to meet specific conditions. They are arranged to simplify figuring, and all essential data is contained on a letterhead-sized sheet.

Sheets are designed to aid in the selection of "all season" air-conditioning units, as well as heating and cooling coils. They are available on request from Fedders headquarters here or from any of the nine Fedders branches.

36 of 76 Drug Stores In Dayton 'Considering' Conditioner Purchase

DAYTON, Ohio—Owners of independent drug stores in this city are definitely in favor of air conditioning their establishments, but are waiting until conditions become decidedly better before they do anything about it, a recent survey made here discloses.

Thirty six out of a possible 76 druggists indicated that, while they will not have such installations made this year, they will buy equipment when they feel they can afford it.

Only one druggist indicated that he had no intentions of installing cooling equipment, believing that "the return on the investment would not justify the expense." Two others said they did not need the equipment, that their stores were cool enough without it.

No independent drug store in Dayton owns air-conditioning equipment at the present time, the survey showed.

Only five druggists said they would buy conditioning equipment on instalment terms. All store owners considering installations said they believed there would be a definite increase in their sales as a result of adding cooling equipment. Although "sold" on the value of cooling, some druggists who did not own their stores said they would not install systems unless their landlords paid for them.

Six store owners favored either Frigidaire or Airtemp equipment, preferring to use Dayton-made products. The others had made no decision, or said they "had given no definite study to the matter."

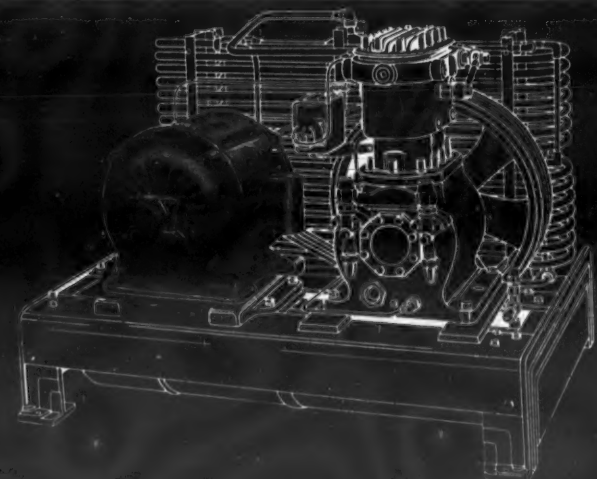
Sixteen druggists said they planned to buy modern heating systems for use in conjunction with their conditioning systems during the winter months.

In each case, the entire store would be air conditioned; the system would not be confined to certain departments. One druggist said he preferred portable units, which could be moved to various parts of the store as needed.

Gallaher Drug Co., operator of 12 stores in Dayton and 22 others elsewhere in Ohio, West Virginia, and Kentucky, has five air-conditioned stores in Dayton and 13 out of town. The company is not planning to condition additional stores now.

To Have
Satisfied
Customers

Your Equipment Must Give Satisfactory Service



Safeguard the reputation of your equipment by selecting a
DEPENDABLE WAGNER MOTOR
for your Compressor, Blower, and Pump Drives

It is highly important that you select the right motor for the job, since the failure of the motor means the failure of the equipment which it drives. Wagner Type RP motors are available with the necessary mechanical and electrical characteristics for quiet, smooth operation, and dependable, trouble-free service. It is not by accident that Wagner motors continue to give faithful, trouble-free service year after year on all types of air-conditioning equipment. In the panel at the left are a few reasons why Wagner motors enjoy such an enviable reputation in the refrigeration and air-conditioning industry.

Ask!

For Bulletin 182 on Wagner
Polyphase Motors.

Wagner Electric Corporation
6400 Plymouth Avenue, Saint Louis, U.S.A.

Reflects Quality

ANSUL

SULPHUR DIOXIDE
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ANSUL CHEMICAL COMPANY • MARINETTE, WISCONSIN

Distributor-Dealer Doings

Philco Dealers In Pittsburgh Territory Win Vacation Through Canada For Meeting Quotas In Contest

PITTSBURGH—Carrying out its slogan of "Sell Philco and See the World," C. R. Rogers Co., distributor in this territory for Philco radios, Kelvinator products, and Bengal ranges, recently conducted a vacation trip to Canada for winners of a company-sponsored contest.

Each dealer was assigned a quota for this contest, and each one knew definitely when he had won one or more trips. No element of chance entered into the contest.

All details of the promotion were handled by C. F. Gaylord, vice president and general manager, and J. W. Rondel, advertising and sales promotion manager of C. R. Rogers Co.

Paul Chamberlain, sales manager of Rogers' Kelvinator division, acted as official photographer of the trip, taking over 1,000 feet of movie film and several hundred still pictures. These will be used in dealer meetings to stimulate interest in further promotions.

First day of this four-day all-expense (even to tips) outing was spent en route to Bigwin Inn, Bigwin Island, Ont., final destination of the

party. After stopping for a complete once-over of Niagara Falls, the group left for Huntsville, Ont., on a special train of the Canadian National Railway. After a twilight boat trip through the Lake of Bays, the party finally reached Bigwin Inn.

Participants in the Rogers trip literally took over the entire island for two days, enjoying fishing, boating, swimming, and all kinds of sports, as well as dancing and just lounging before one of the Inn's 13 huge fireplaces.

The homeward trip included a tour of Toronto, with dinner at the Royal York hotel, and a night stop at Niagara Falls, before the final return to Pittsburgh.

Direct Pittsburgh Dealers' Vacation Trip



C. R. Rogers Co., Pittsburgh distributor of Philco radios and Kelvinator products, sponsored an all-expense vacation trip to Bigwin Island, Ont., Canada, for quota-meeting dealers in a recent sales contest. Directing the vacation trip were Paul L. Chamberlain, Kelvinator division sales manager; J. W. Rondel, advertising manager; Ward M. Caldwell, Philco district manager; C. F. Gaylord, Rogers' general manager; L. F. Entrikin, J. E. Meyers, and Al Becker, railroad officials.

Apex Appoints Four New Household Distributors

CLEVELAND — Appointment of four new distributors of Apex household appliances has been announced by Charles W. Smith, general sales manager.

New distributors are: Universal Distributing Co., Richmond, Va., covering Virginia and southern Maryland; Steves Distributing Co., San Antonio, Tex., covering Texas and surrounding territory; Philco Distributing Co., Syracuse, N. Y., covering Syracuse and surrounding area; and Ignition Service & Supply Co., Albany, N. Y., covering Albany and vicinity.

Cleveland Representative Named By Carrier

CLEVELAND — George Worthington Co. has been appointed local representative for Carrier Corp.'s line of portable air conditioners. A. C. Boltz has charge of this new department.

Greenville, N. C. Distributor Discontinues Branch

GREENVILLE, N. C.—Carolina Sales Corp., distributor in this territory for Kelvinator electric refrigerators, ranges, and washers, Servel Electrolux kerosene refrigerators, Universal electric ranges and appliances, and Philco radios, has discontinued its branch office in Raleigh, N. C., Jas. T. Little, general manager, has announced.

The Raleigh office was established last September as headquarters of the company's new sales engineering department, handling air-conditioning and commercial refrigeration work.

Because the market does not warrant continued effort from Raleigh, the new department has been included in the Greenville office, and will handle installations of 10 tons and less, Mr. Little explained. Commercial refrigeration activity, he added, will be concentrated on specialty merchandising, including beverage, water, and milk coolers.

Roy E. Cawhern, formerly manager of Carolina Sales Corp.'s sales engineering department, has resigned from the company. E. E. Rawl, general sales manager, has assumed supervision and responsibility of all commercial and air-conditioning sales.

New Jersey RCA Dealers View 1939 Radio Line

NEWARK, N. J.—A special dealer preview of the 1939 line of RCA Victor radios was held here recently by Krich-Radisco, Inc., RCA distributor in northern New Jersey, in connection with the celebration of the fortieth anniversary of the introduction of the "Victor dog" trade mark by RCA Mfg. Co.

The Krich auditorium was decorated for the event, displays were presented in booths, and living room unit displays centering around different radio models were exhibited on the revolving stage.

Earl Pullen, manager of the distributor's RCA Victor division, announced that radios, tubes, and Victrolas will be sold under the provisions of the New Jersey fair trade act.

Mayflower To Distribute Apex In St. Louis

ST. LOUIS—Mayflower Lamp & Sales Co. has been appointed distributor in this territory for Apex appliances, Charles W. Smith, general manager of Apex Rotarex Corp., Cleveland, has announced.

Morris Laskey is president and Gene Straus sales manager of the Mayflower company.

A
SMASHING
NEW
SALES
PLAN!

PRESENTED BY STANDARD,
THE OLDEST EXCLUSIVE MANUFACTURER OF ELECTRIC
RANGES, WITH OVER 200,000
USERS

EVERY WOMAN WILL WANT TO KNOW ABOUT
"Free Cooking"

A proven feature which Standard will emphasize in its advertising and selling.

DEALERS EVERYWHERE WILL CASH IN ON OUR
"Free Cooking" SALES PLAN

A Standard feature with sensational sales possibilities. When explained to your community, it will create a buying wave never before known in electric range selling.

ELECTRIC UTILITIES WILL WELCOME
"Free Cooking"

A new plan that will banish the bugaboo that remains in the minds of some women that electric cooking is costly. An opportunity to render a real public service by bringing to women everywhere the convenience, cleanliness and economy of electric cooking.

242 General Electric Office Employees Use 14 Appliances Apiece, Research Survey Shows

SCHENECTADY, N. Y.—General Electric Co. office employees here use an average of 14 appliances apiece, according to results of a survey of 242 General Electric office workers made by the market research section of the company's publicity department.

This survey, which covered all electrical appliances and did not specify G-E products alone, showed a total of 3,360 appliances in use. Number of lamp bulbs in service totaled 6,033, or an average of 25 per person.

Comparison of the results, after elimination of the unmarried, showed that the 210 employe homes remaining were above the national average in the appliance-ownership scale. In refrigerators, the figures were 78.2% for the G-E employes to 49.4% for the national average; in ranges, 16.7% to 9%; in radios, 90.5% to 82%; in vacuum cleaners, 85.7% to 48.8%; in oil furnaces or burners,

14.7% to 5.5%.

The 242 reporting employees owned 170 refrigerators, 143 washing machines, and 278 radios. Greater numbers of workers, of course, owned smaller appliances. Clocks led this list with a total of 408, and others followed in this order: irons, 261; toasters, 216; vacuum cleaners, 206; fans, 136; curling irons, 130; percolators and urns, 127; heating pads, 123; and waffle irons, 122.

The list continues with 55 electric razors, 34 floodlights, 18 exposure meters, 14 light meters, nine time switches, three electric blankets, a short-wave radio transmitter, a worm digger, a paint sprayer, and a pants presser, among other things. Fifty-seven portable motors also were accounted for in the survey of the worker's appliances.

Only 53 appliances were listed in the questionnaire, but answers were received covering more than 80 classifications.

Pennsylvania Fair Trade Act Is Upheld In Case Involving Radio Sale at Discount

(Concluded from Page 1, Column 5)

did sell a radio to a member of the general public at less than the price stipulated in the contract between distributor and retailers.

The court also found that the association is engaged in selling commodities at less than retail list or advertised price "to its members, or to its dependents, or to members of affiliated organizations."

Defendant had asked that the suit be dismissed because it had no knowledge of the fair trade act signed by the plaintiff, and claimed that the act did not impose any liability upon the association, since it was not engaged in selling to the general public.

In his ruling, Judge Davis finds that "the Fair Trade Act of June 5, 1935, is constitutional in so far as it relates to resale price maintenance contracts made in connection with sales or shipments within Pennsyl-

vania, which bear the trade mark, brand, or name of the producer or owner of such commodity, and which are in fair and open competition with commodities of the same general class."

The court also held that although there was no evidence that the defendant association knowingly engaged in unfair trade competition, it is nevertheless subject to the provisions of the Fair Trade Act, "and should be restrained from wilfully and knowingly advertising, offering for sale, or selling any commodity which bears, or the label or content of which bears, the trade mark, brand, or name of the producer or owner of such commodity, and which is in fair and open competition with commodities of the same general class produced by others, at less than the price stipulated in any contract entered into pursuant to the provisions of the act, whether or not it be a party to such contract."

Cleveland Dealers Approve New Code Of Trade Practices

(Concluded from Page 1, Column 5)

stipulated by the wholesaler. This permits the distributor to handle the trade-in problem in his own way.

2. Reports of any franchise violations will be made to a central agency.

3. All present franchises are to be filed with a dealer's committee. Franchises for all new lines of merchandise are to be filed with the dealer's committee, provided there are any basic changes from the franchise now in effect.

4. It is recommended that wholesalers limit the franchising of dealers to those who are considered legitimate dealers maintaining places of business with display floors open to the public and carrying representative lines of radios or appliances, or both.

5. All home appliance and radio advertising, which includes newspaper, both display and classified, and also radio advertising, is subject to approval by the Cleveland Better Business Bureau. This is part of the dealer's franchise.

6. A dealer must confine his business to retail sales only.

All violations of these rules, as well as other complaints regarding distributor-dealer relationships, are to be reported to a central agency comprised of two outlying dealers, two downtown dealers, and three distributors, any five of which may constitute a quorum.

The advertising regulations were read to the meeting by William M. Farrar, secretary-manager of the Cleveland Better Business Bureau.

Fixed trade-in allowances are barred from advertising by the BBB code, the rule stating that "definite dollar and cent or definite percentage trade-in offers shall be eliminated from home appliance advertising." Also ruled out are such phrases as "the best deal in town . . . highest trade-in allowances . . . we meet or beat all trade-in offers."

The advertising rules also forbid all "free" or "give away" claims, all claims of continually underselling competitors, such phrases as "no finance charge," and violation of the Ohio Fair Trade Act, which permits distributors or manufacturers to fix resale prices.

These regulations have been adopted not only by dealers and distributors, Mr. Farrar said, but by the three daily newspapers, the four radio stations, the Central Outdoor Advertising Co., Stearns Advertising (street car cards), Cleveland Shopping News, and Consolidated Press & Printing Co. (circulars).

Under the "pre-censorship plan," all appliance advertising and scripts must be submitted to the BBB, where it is checked for conformance with the rules. Advertising not approved or changed as ordered will not be accepted by the media.

Ben Levin, commentator of radio station WGAR, was chairman of the meeting at which the advertising and merchandising codes were presented. Speakers besides Mr. Agnew and Mr. Farrar included Floyd E. Brown, head of the market survey department of the Cleveland Plain Dealer; Frank Grdina, of A. Grdina & Sons, president of the dealers' association; and Charles Davis of Davis & Moore, appliance dealership.

Interest of manufacturers and distributors in successful conduct of the sales and advertising programs was indicated by the presence at the meeting of representatives of American Stove Co., Arnold Sales Co. (Zenith, ABC, Leonard), Boss Washing Machine Co., Apex Electrical Mfg. Co., Cleveland Distributing Co. (Easy, Sperton), Cleveland Cooperative Stove Co., Elliott & Evans, Inc. (Electrolux), Frankelite Co., Frigid-Aire division of General Motors Sales Corp., General Electric Supply Corp., Graybar Electric Co., Kane Co., Maytag Sales Co., Midland Electric Co., Mook Electric Supply Co., Refrigeration & Appliance Corp., Inc., Roper Distributing Co., E. W. Smith, Inc. (Fairbanks-Morse), Strong, Carlisle & Hammond, Inc. (Norge, Philco), Tappan Stove Co., Tinnerman Stove & Range Co., Westinghouse Electric Supply Co., and George Worthington Co.

Cooking!

STANDARD PROPOSES TO POINT OUT THE REAL ECONOMY OF ELECTRIC COOKING UNDER THE SENSATIONAL SLOGAN "Free Cooking"

AN ADVANCED PLAN BACKED BY SOUND SELLING FEATURES

1. A line that has always pioneered and is now further improved and refined...composed of six Standard models designed to serve 98% of the range market which puts Standard ahead in future sales opportunities.

2. A sales organization enlarged to handle increasing sales volume...merchandising plans extended to support that progress.

3. The oldest exclusive electric range manufacturer offers new advertising and selling ideas, with greater service to distributors, dealers and electric utilities—all with one end in view—to extend electric range service to more homes—to build revenues for the utility—and to produce greater sales and profits for the distributor, dealer and manufacturer.

AN ELECTRIC RANGE WHICH HAS STOOD THE TEST OF TIME

Over 200,000 users of Standard electric ranges pay tribute to perfect performance through 25 years of service. The goodwill of these customers, successfully served, will lead the way to future sales.

Copyright 1938—Standard Electric Manufacturing Corporation

"Free Cooking"...A MESSAGE THAT WILL APPEAL TO MILLIONS

Told through consumer advertising, broadcast in direct mail literature, discussed in cooking schools and repeated by thousands of salesmen selling Standard ranges, this message will multiply consumer interest in Standard electric ranges. Backing that public interest is a line of ranges engineered to highest approved standards. Beautifully designed to meet modern consumer requirements with eye

appeal unexcelled by others, every Standard model is equipped with the approved Chromalox surface heating unit. There is a Standard model, competitively priced, to meet every home cooking need. To reach the hotel and restaurant market, Standard manufactures a full line of commercial units.

With an augmented executive and sales personnel and increased manufacturing facilities, Standard welcomes the opportunity to serve the energetic and live distributor and dealer.

SEND
COUPON

FOR FULL PARTICULARS
ON THE HOTTEST
RANGE SELLING PLAN
EVER OFFERED!

STANDARD ELECTRIC MANUFACTURING CORPORATION
TOLEDO - OHIO

Standard Electric Manufacturing Corp.
2006A Ohio Building

Please advise details of your distributor-dealer Free Cooking plan.

Name _____

Address _____

City _____ State _____

Service Methods

Methods of Preventing Moisture From Entering a System and Suggested Remedies If Water Does Get In

By Geo. H. Clark, Refrigeration Engineer, Detroit Lubricator Co.

ONE of the greatest sources of trouble in the expansion valve of a refrigerating system is moisture in the system. Moisture affects a refrigerating system adversely in two ways: (1) the mechanical freeze up at the expansion valve throttling point; and (2) the corrosive condition resulting from the moisture in the system.

The mechanical freeze up is something which demands adequate and immediate attention from the service man and in general it may also serve as an indicator that corrosive action will follow.

It is quite probable that more automatic and thermostatic expansion valves are removed from refrigerating systems because of mechanical freeze ups than for any other cause. It is probable that more valves are removed from this cause than from all other causes where the valves are less than two years old.

One reason that so many valves are removed due to mechanical freeze ups is that the service men in general find it difficult to correct the condition readily on the job.

How Moisture Gets In System

The amount of moisture in the job will usually depend upon how the moisture got into the system. In the past some of the machine, coil, and accessory manufacturers may have been careless in drying out their equipment or have not had proper facilities to do a good job. In some cases these manufacturers have gone into production on low-pressure equipment for the ammonia field where moisture was not a serious problem.

In general, machine and accessory manufacturers have improved considerably in their drying methods. However, as little as two years ago machines fresh from crates have been found with as much as a pint of water in the liquid receiver.

Where manufacturers or service men have slipped up in removing water from equipment the amount of moisture contained in a system

may be considerable.

Large amounts of moisture may get into a system due to service failures. Occasionally a water coil in a receiver may freeze up and break, allowing the water to get into the receiver. In some cases a leak may occur on a section of line where a vacuum is maintained, in which case moisture may be drawn in as a result of frost or ice melting at the point the leak occurs.

Small amounts of moisture may get into a system with air. Small amounts of moisture may also get into a system due to high humidity air conditions, and the inability to remove all air from a system in evacuating when the job is first started up. In cases such as these, the quantity of moisture that may remain in a system is quite small. This will also be true in general in cases where the moisture gets in with the lubricating oil or the refrigerant.

In some cases too, it seems as though some part of the system itself retains moisture for some time after a system is started up. Possibly the metals which may be at all porous, such as cast iron, will hold and slowly give up moisture over a period of months or years. Indications are that some such condition occurs.

Effect of Moisture In System

The effect of the moisture in a system in very small quantities may be to freeze out at the expansion valve. The amount of moisture which will cause trouble of this kind, which plugs the valve, depends upon the size of the valve orifice and the valve construction. Less than one fourth of a small drop of water in the entire system may cause difficulties of this kind. This amount of moisture will be present in about 30 to 40 cu. in. of high humidity air at 90°, or in the volume of air occupying the same space as one pound of methyl chloride.

Apparently the amount of moisture required to cause freeze ups in Freon systems is less than that re-

quired to cause freeze ups in methyl chloride systems.

Sulphur dioxide systems do not have moisture freeze ups at the valve orifices except in the most extreme cases, as the gas so readily combines with any moisture which may be in the system.

FREEZE UPS RESULT

The service problem in connection with moisture in refrigerating systems may primarily be the problem of preventing mechanical freeze ups. A secondary consideration with methyl chloride or Freon and a primary one with sulphur dioxide is the corrosion resulting from acids formed from moisture, air, and the refrigerants.

With sulphur dioxide and moisture, sulphurous and sulphuric acid reactions appear to occur. The result of these reactions is to break down oils, causing carbon deposits and sludge to form in the system, which result in stoppages in lines and screens and compressor "freeze ups" or "stick ups." Expansion valves tend to leak in a short time and compressor valves are eaten out quickly under such conditions.

Use of Xylene and Acid Neutralizers

The use of Xylene in small amounts in a system having difficulties due to corrosion and carbon sludge tends to enable a compressor to keep in operation and decrease screen and line stoppages. Its action seems to be in dissolving the binder of the carbon sludge.

In other words it changes the carbon sludge into an inky solution which circulates through the system without gumming up the pistons.

Xylene should not be used where the system contains any Duprene gaskets as the Duprene will swell up and cause trouble. Mechanically the use of Xylene in small quantities seems to be adequately justified. It is doubtful however if Xylene will prevent the corrosion of compressor and expansion valves.

USE OF DRYERS

In service, a number of drying agents or acid neutralizers are supposedly of value in minimizing corrosion. Any neutralizing action of these agents, such as zinc, calcium oxide, or aluminum oxide (activated alumina), is so slow it is necessary to leave the dryer cartridge in the system continuously or at least for a good many days.

The use of these agents or calcium chloride is especially effective if made in the suction line. In some cases a dryer in the liquid and suction line is advisable and will minimize corrosion in expansion valves.

Wherever possible, in a sulphur dioxide system which is presenting difficulties resulting from moisture in the system, the refrigerant should be taken out of the system, the lines and other refrigerant containing parts should be cleaned out and dried, and the system replenished with new refrigerant and oil.

Moisture In Freon and Methyl Chloride Systems

In Freon systems the most serious

and immediate effect of moisture is the mechanical freeze up, although reactions resulting from the formation of hydrochloric and hydrofluoric acids tend to corrode expansion valves and other parts.

With Freon, freeze ups can be prevented by adding a small quantity of alcohol or methanol to the system. The use of alcohol or methanol is not recommended, however, as it does not eliminate corrosion and in fact may increase it.

In some cases a gummy action has been produced through the use of alcohol which has caused compressor stick ups and frequently causes expansion valves to stick, especially after defrosting or shut down periods. Several large companies which formerly recommended the use of alcohol in Freon systems now advise against it.

Where the amounts of moisture in the system are not enough to cause frequent freeze ups the use of metallic oxides such as calcium oxide, calcium sulphate, and activated alumina has worked out nicely. Where these drying agents are used the cartridges containing them may be installed for several days or permanently in either liquid or suction lines.

LOCATION OF DRYERS

These dryers are reputedly more effective in suction lines than in liquid lines, but since the expansion valve is most affected by the moisture the dryers are generally installed in the liquid line directly ahead of the expansion valves. The use of these drying agents serves to eliminate or minimize corrosion trouble.

Where sufficient moisture is present in Freon systems to freeze up quickly the use of calcium chloride or barium oxide as drying agents has best served its purpose.

Some published information has shown that calcium chloride and barium oxide are slow drying agents and lists activated alumina as being quickest and best of the drying agents. This is probably true, but nevertheless personal experience and the experience of others has shown that regardless of drying rates Freon refrigerating systems will have expansion valve freeze ups for days after dryers containing calcium oxide or activated alumina have been installed and the refrigerant recirculated many times.

On the other hand experience has shown that calcium chloride will stop a freeze up almost at once. Calcium chloride dryers are not widely recommended, however, due to the known fact that their continuous use produces a corrosive system. Where water is present in large quantities it may wash the calcium chloride out of the dryer and into the rest of the system which may require the complete washing out of the whole system.

USING TWO TYPES

Where the quantity of water is not excessive, a large calcium chloride dryer may be used in the system for one or two days and a permanent dryer of activated alumina, calcium oxide, or calcium sulphate used afterwards to minimize corrosion after the calcium chloride has eliminated the freeze ups.

Some service men have made a practice of using barium oxide dryers in the liquid line for one or not more than two days in every commercial installation using Freon or methyl chloride. Barium oxide combines with moisture rapidly and the heat of combination serves as an indicator to indicate the degree of moisture in the system.

The general procedure followed is to install the barium oxide dryer in the liquid line and start up the system. If the dryer heats up it is an indication that moisture is being absorbed rapidly. In this case the system is pumped down and the dryer replaced with a fresh one.

If the dryer does not heat up, it is left in the system one or two days

and then removed entirely and the system left without a dryer.

Procedure In Case of Valve Freeze Ups

Where an expansion valve, either automatic or thermostatic, is suspected of being frozen up the following procedure is recommended:

1. Crack the liquid line to be sure there is liquid to the valve inlet. If there is liquid at the valve inlet and still nothing passing through then—

2. Pump down liquid line and balance pressures if possible. If there is more than one valve in the system the liquid can be removed from the liquid line through the valve which is not plugged. A liquid to suction line bypass will also serve if one is available. After pumping a vacuum on system, open liquid valve to bring pressure just above atmospheric pressure without having liquid in line.

3. Remove valve and dry out. Check to be sure plugged screen or dead power element is not cause of trouble. To dry out, wash out valve with alcohol and then warm to evaporate alcohol.

4. Install adequate dryer and re-install valve and put system in operation. Maintain back pressure above frost pressures for some time if possible.

WHERE VALVE IS FROZEN

If the valve is frozen and there is no way to pump the liquid line down the valve may be warmed with the machine off until the suction pressure is above frost pressures. The valve should open then provided there is nothing more wrong than a frozen valve and provided the valve is adjusted to open at pressures above frost pressures. Do not try to thaw the valve out with a torch when the machine is operating and maintaining a low pressure at the valve outlet.

Be sure that any means by which moisture could get into the system are eliminated. If the system where valve freeze ups are occurring is an ice cream cabinet or other fixture with coil temperatures very low it may be very difficult to get the moisture entirely out of the system due to the moisture remaining in the evaporator coil as ice. In order to get the moisture out of such a fixture the temperature should be allowed to go up to at least 40°. The coil can then be flushed out with alcohol and then blown dry with CO₂ or any other dry gas at high pressures.

DRYING VALVES

A system may be dried out by changing valves. In some cases service men have taken out a frozen up valve and replaced it with a new one. When that also freezes they assume it is defective and replace with another. Eventually a valve works all right and the service man sometimes assumes the other valves were defective. Actually some moisture may be retained in each valve and thereby removed from the system. Washing the valve out with alcohol and drying will enable it to perform as good as a new valve provided the freeze up was the only trouble.

Another cause of apparent freeze up where the service man is satisfied that a system is dry is the use of an improper oil. If a heavy or high pour point oil is used the screens or valve orifices may plug up tight at moderate to low temperatures and then clear out when the valve is removed.

In any event the valves should be tested after being removed from the system to see whether it is actually the valve that has lost its charge or is plugged at the valve seat or whether the trouble, as is usually the case, is not due to a plugged screen, moisture in the system, or an improper oil.

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FITTINGS

Commercial Refrigeration

Rentschler Reports on Tests Showing How 'Sterilamp' Kills Bacteria; Gives Data On Life of Lamp & Operating Factors

STATE COLLEGE, Pa.—How the Westinghouse "Sterilamp" works to kill bacteria and mold and thus to offer a possibility of being used in conjunction with refrigeration for food preservation was explained by Dr. H. C. Rentschler, one of the two men most prominently identified with the development of the lamp, before the meeting of the American Society of Refrigerating Engineers here late last month.

Dr. Rentschler described how the lamp was developed and then answered a number of questions about the possibilities of the lamp in commercial applications (see June 29 issue for report of the discussion.)

"The main purpose of refrigeration is to inhibit spoilage caused by bacteria and mold in food preservation," Dr. Rentschler said as he began his talk. "That ultra-violet radiation has the power of killing bacteria was realized almost as soon as bacteria was discovered.

"As early as 1887 it was shown that spores as well as bacteria are destroyed when exposed to the ultra-violet from sunlight. The use of ultra-violet radiation from artificial sources has frequently been suggested as a bactericidal agent and for the prevention of mold growth. "The possible combination of ultra-violet radiation with refrigeration is a logical one. To make such a combination practical a great deal of information on the effects of radiation on bacteria and mold was accumulated during the last year or two.

HOW IT IS PRODUCED

"Ultra-violet radiation in the bactericidal region is produced only by discharges through gases or vapors such as by mercury or open arcs, and cannot be produced by any incandescent source.

"It is extremely difficult to control the intensity of such sources so that it was necessary first to develop a simple method for quantitatively measuring the effective bactericidal radiation so that the different factors influencing the effects can be determined and controlled. This was accomplished by the use of a tantalum photo electric cell in our ultra-violet meter developed several years ago.

"The tantalum photocell responds only to that wave band which has bactericidal action and which is useful in destroying mold spores and, further, evaluates this radiation in about the same manner as the radiation is effective.

"The meter is an integrating device. That is, it measures in arbitrary units the total effective quantitative radiation which has been received by the active surface rather than the intensity. This is preferable when using a source of radiation which fluctuates in intensity.

MEASURING RADIATION

"The operation of the meter is simple. A condenser is charged by the photo electric current through the cell produced by the radiation from the ultra-violet source. A special glow tube connected across the condenser discharges it when the voltage reaches the breakdown potential across the terminals of the glow tube. Each discharge is recorded on a counter operated by a relay in the discharge circuit. Thus the total effective radiation of an exposure is measured by the number of such discharges.

"Early in our work we developed a very simple method for uniformly seeding a number of petri plates with bacteria or mold spores. The culture medium containing the bacteria to be tested is sprayed into a

large box or chamber using an ordinary paint spray gun operated at about 40-lbs. pressure.

"The spray was allowed to settle for about a minute to eliminate larger drops. A tray of sterile agar petri plates was then placed in the box and the organisms allowed to settle on them for a few minutes. The seeding was found to be exceedingly uniform and the work of determining the effect of radiation is greatly facilitated.

"The method becomes relatively simple. One or two plates from the tray are incubated and serve as controls. Other plates are subjected to varying amounts of radiation. This was done by placing the plate and the photo cell at the same distance from a radiation source. The plate was exposed to the radiation during a measured number of discharges of the meter, after which the plate was incubated.

LETHAL EFFECT

"The difference in the number of colonies on the control and exposed plates clearly represented the number killed by the measured radiation from which the percentage killed by the radiation was determined. By this method of uniform seeding and exposure to definite known radiations reliable results are made possible with a minimum amount of work.

"Different plates from the same seeding were exposed to the same amount of radiation from such widely different sources as mercury arcs or discharges in corex or quartz or to the radiation from various open carbon arcs. The percent of organisms killed by the various sources was, within experimental error, the same, showing the reliability of the use of the tantalum cell in this meter for measuring the bactericidal action from different ultra-violet sources.

"The lamp used in this demonstration is what is known as the Sterilamp. About 80% of the total radiation generated by the discharge through this lamp is in that part of the spectrum where the bactericidal action is greatest, and yet there is produced an inappreciable amount of ozone.

ENERGY REQUIRED

"The lamp requires only a small amount of energy—about 10 watts—has a long useful life—approximately 6 months of 24-hour-per-day operation—and is simple and reliable in operation with relatively small fluctuations in output.

"The temperature is only a few degrees higher than that of the surrounding air and consequently the lamp is well suited for operation in refrigerators.

"By the use of the meter definite factors regarding the action of radiation for the killing of bacteria and the prevention of mold growth have been established. Only a few of the more important in connection with refrigeration are the following:

- "1. Over a wide range of intensities the radiation required to kill a fixed percentage of a given organism is a constant.
- "2. The killing of bacteria or mold spores by the ozone produced by the radiation from even a quartz lamp is negligible as compared with the killing by the radiation itself.
- "3. Air-borne organisms require

much less radiation (only about one-tenth) than is required to kill these same organisms after they have settled on a petri plate or in a liquid medium. This is of special importance in the use of radiation for sterilizing air as in air conditioning.

"4. The amount of radiation required to kill different organisms varies greatly. Thus with a given photo cell and condenser the radiation producing seven discharges of the condenser will kill typhoid as effectively as 15 discharges for coli, or 30 subtilis and several hundred for most types of mold.

USE WITH COOLING

"This special type of ultra-violet lamp placed in refrigerators will prevent mold and bacterial spoilage on meat not only at low temperatures such as are normally used in holding boxes but at considerably higher temperatures and at high humidities (90 to 95% or higher).

"By the use of air circulation this spoilage is prevented in the shaded as well as in the directly exposed portions of the meat in the refrigerator.

"Experimental tests show that air passed over the lamps has imparted to it bactericidal power which not only prevents bacterial and mold growth, but destroys the bacteria and mold spores so that they cannot again be incubated after the necessary exposure to such air."

Canadian Govt. Grants To Storage Firms Debated

OTTAWA, Ont., Canada—Canadian cold storage companies, many of which have constructed plants with financial aid of the Dominion government, should not be allowed to control prices for their own benefit, but should be made to operate toward stabilizing prices in the interest of farmers and producers, Hon. H. H. Stevens, Kootenay East, declared in the House of Commons last week.

The speaker urged that operating practices of companies be carefully surveyed from the standpoint of farmers and producers. He made it clear that he was not in favor of discontinuing grants for construction of cold storage plants.

The question of whether federal grants were used for promoting commercial ventures or assisting producers has been raised before, Hon. J. G. Gardiner, minister of agriculture, told the House. To date, grants totaling \$2,570,000 have been made under provisions of the Cold Storage Act, he added.

Washington Freezing Plant Nears Completion

KENT, Wash.—A large processing and freezing plant for vegetables is being completed here by Washington Frozen Foods in buildings acquired from the Ice Delivery Co. The company had been operating during the past four years in conjunction with the Kent plant of the Pacific Refrigerating Co.

The new plant, being equipped with new and modern freezing equipment, will permit the company to increase its production in line with increasing demand.

Dealer Gets a Royal Welcome



A dealer for Mills refrigerating units pays a visit to the offices of the commercial refrigeration division of Mills Novelty Co., is shown details of product development and production methods, and meets some of the sales force. From left to right: the dealer—Mr. Spack of the Marcus-Spack Co.; Ray Polley, sales manager; Andy Bohmer; Jerry Jernberg, Chicago district sales representative; and Alexander T. Murray, district sales manager for Minnesota, Iowa, and Wisconsin.

Trailer Is Only Store of Eau Claire, Wis. Dealer In Commercial Refrigerators

EAU CLAIRE, Wis.—A commercial refrigeration dealership entirely on wheels is the "traveling show room" used by C. A. Peterson of Eau Claire in covering this farm and lake territory prospecting for sales of C. V. Hill & Co. display cases and refrigeration equipment.

Unlike the trailer coaches often used by household refrigerator dealers in some sections for house-to-house canvassing, the "traveling show room" is Mr. Peterson's only show room, making him possibly the only refrigeration dealer in the country to operate in this manner.

Towns in Mr. Peterson's territory

are often 50 miles or more apart, and a trailer is about the only means he can successfully use to save his prospects a long trip into some central headquarters for a demonstration.

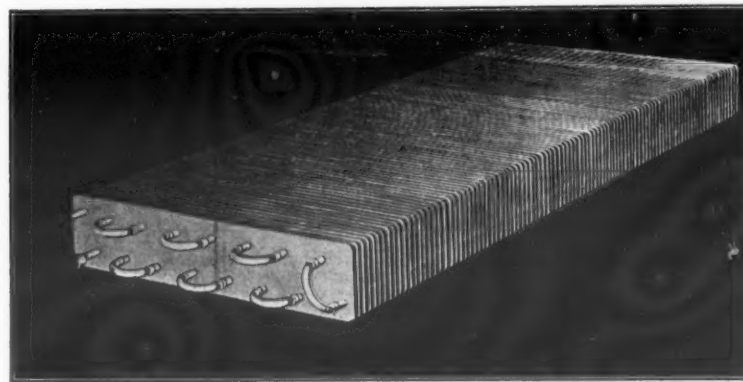
Covering his territory, he often travels upwards of 300 miles a day. When night comes, he sleeps in the trailer.

Using the show room on wheels makes Mr. Peterson an "all day, every day" canvasser. When he finds a prospect for Hill equipment, all he has to do is drive up to the merchant's door, run an electric cord into the store, light up the case, and go into his demonstration.

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The Original Cross Fin Coil

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FOLLOW the example of outstanding refrigeration men everywhere, the keenest equipment buyers. For efficient, low-cost refrigeration, the satisfaction and prestige of continuously dependable, superior performance, be sure of the quality of your coils. Avoid disappointment, dissatisfaction and loss—specify and use none but the genuine Larkin Coils . . .

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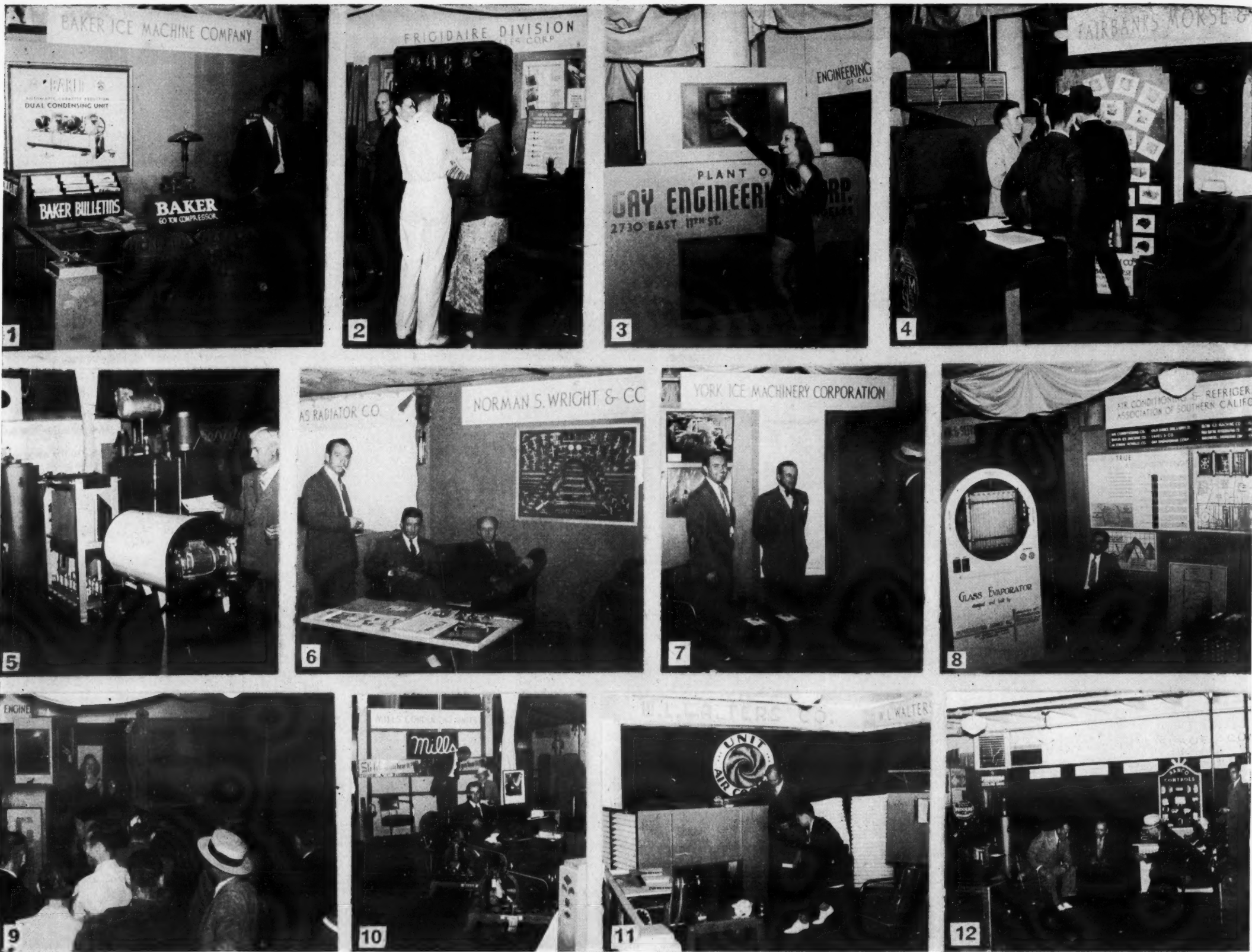
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Mechanical Cooling Equipment In the Spotlight At First Los Angeles Air-Conditioning Show



The first Los Angeles Air Conditioning, Cooling & Heating Show opened July 7 in the headquarters of the Thermo Air Conditioning Institute, with 40 manufacturers exhibiting. On hand as the show opened was L. P. Roth of Refrigeration Service, Inc., Los Angeles refrigeration supplies jobber and enthusiastic camera addict, who has taken many other pictures of industry activities for the News.

(1) David Mackenzie of Baker Ice Machine Co. lets go with a broad

grin as he mans the booth in which a big compressor is on display. (2) "Business already," exclaims H. M. Bailey of Eaves & Co., distributor of Frigidaire air-conditioning equipment, as he steps up to interest a couple of prospects. (3) Ah-h. One of those California bathing beauties poses for some publicity stills, and Cameraman Roth is not caught napping. (4) Conference. D. W. Evans of Fairbanks, Morse & Co.; Marvin Wasserman and Edward Ford of J. Herman Co., F-M air-conditioning distributor, in the

Fairbanks-Morse booth discussing the show.

(5) "Bob" White of Day & Night Water Heater Co. practices up on a demonstration. (6) Left to right: E. B. Rasmussen, John M. Haas, and J. H. Hatch, all of Norman S. Wright Co., manned the company's booth, in which Mueller Brass Co. products were exhibited. (7) One of the new self-contained "store" conditioners was a big feature of the York booth, in which we find Yorkmen Dwight Hart, Don Beck, and Howard Wimer. (8)

Among the many interesting things in the education exhibit sponsored by the Air Conditioning & Refrigeration Association of Southern California was the glass evaporator furnished by Refrigeration Service, Inc., to which W. A. Pruitt points.

(9) Mr. Roth wasn't the only one attracted by the picture-taking in the Gay Engineering Co. booth. Looks like business will have to wait. (10) Charles Lyall of the commercial refrigeration division of Mills Novelty Co. (in the foreground) in the big

Mills display space. (11) George D. MacArthur (standing) explains a central-station type air conditioner to Merle Barron of Gates Rubber Co. in the W. L. Walters Co. booth. (12) Franklin G. Slagel was on hand to display the various equipment and parts which he handles, including Fedders coils and Ranco controls. Left to right: Mr. Slagel; Jack Shrote, Bedell Engineering Co.; Robert J. Davis, Thermo Air Conditioning Institute; and E. J. Walker of Mr. Slagel's organization.

Another Example of CURTIS' Advanced Engineering Features

CURTIS Water Jacketed Cylinders Assure Better Lubrication—Increase Efficiency

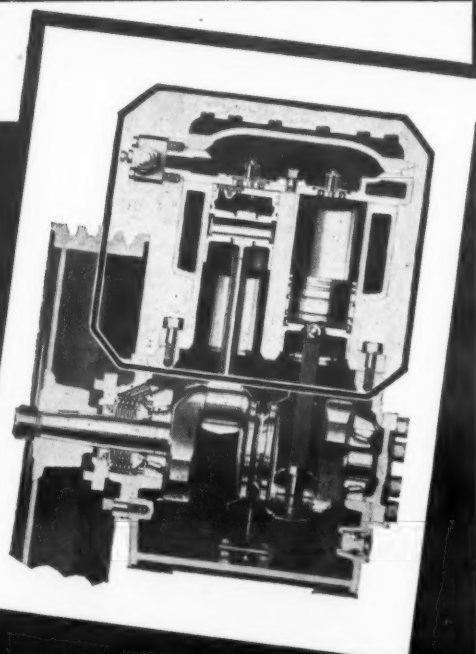
It costs more to make water jacketed cylinders for Curtis compressors, but good engineering practice demands just such extra refinements in the interests of a fine product.

As in an automobile engine, water jackets keep the cylinders cooler, a prime factor in assuring better lubrication and proper oil consistency. Efficiency is likewise increased, for more gas can be compressed at each stroke of the piston, since cooler gas is of greater density.

In such ways has the outstanding performance record of Curtis compressors and condensing units been developed—a record proven in thousands of installations. Sell Curtis units—available in capacities from 1/6 to 30 H.P., air and water cooled, precision engineered to deliver economical, care-free performance.

Write to Curtis for complete information.

CURTIS REFRIGERATING MACHINE CO.
Division of Curtis Manufacturing Co.
1912 KIENLEN AVENUE ST. LOUIS, MO.



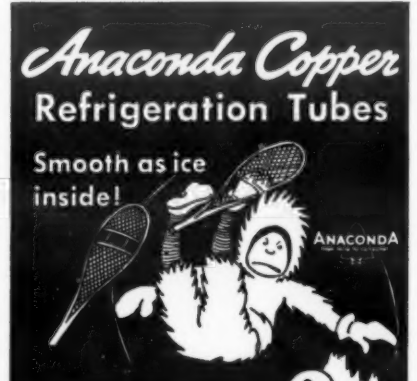
CURTIS
"Builders of Condensing Units Since 1922"

—for every air conditioning and refrigeration requirement.

Glass Brick Hosiery Mill Is Air Conditioned

BURLINGTON, N. C.—A temperature of 83° F. and a relative humidity of 60% are maintained at all times in the modern glass brick Sellers hosiery mill here.

The knitting room in the mill is air conditioned by means of a humidifier and fan. An automatic stoker maintains the building at a constant temperature.



THE AMERICAN BRASS CO.
FRENCH SMALL TUBE BRANCH
General Offices: Waterbury, Conn.

York Oil Burner Co. and Subsidiaries Sold To Thomas Shipley, Inc.

YORK, Pa.—Sale of the York Oil Burner Co., Inc. and its subsidiaries, the York Fuel Oil Co. and the York Oil Burner Sales Co., to Thomas Shipley, Inc., was announced here recently.

The Shipley company is owned, controlled, and operated by the sons of the late Thomas Shipley, who have been associated for many years with the refrigeration industry. Consideration for the sale was not announced.

According to A. J. Seiler, new president of the company, the personnel will remain intact, with E. I. Kraber as vice president, L. H. Brenneman as secretary-treasurer, and Lawrence Knapp as general sales manager.

The York Oil Burner Co. has been manufacturing oil-burning equipment for 20 years.

BUNDY TUBING

Copper-Braced Steel. Copper Coated Inside and Out. Sizes: 1/8" to 3/4" O.D.
BUNDY TUBING CO., DETROIT

Check on Finish Halts False Damage Claims

SAN ANTONIO, Tex.—An effective means of eliminating any possibility of false claims for damaged merchandise, and for placing the blame for such damage on the party responsible, is being employed by the Ellis Chaney Co., Norge distributor here.

As soon as a carload of refrigerators is received by the company, it is unloaded, the refrigerators removed from their crates, and a complete inspection of the boxes (both inside and out) is made.

When the inspector has determined that the finish has not been marred or damaged in any way, he places a small sticker on the inside of the box, usually fastening it to one of the ice cube trays. This sticker reads as follows: "This refrigerator and porcelain has been inspected and found to be in perfect condition when it was delivered to the carrier. Notify and file claim with your carrier if any damage is found when unpacked by you."

Thus the Chaney Co. is protected, and confusion in determining responsibility for damage is eliminated.

No effort is made to check the refrigerator's mechanical unit, the inspection covering only the finish, glass receptacles, etc.

U.S. War Dept. Orders 109 Units For Air Fields

MANSFIELD, Ohio—An order for 109 refrigerators has just been placed with Westinghouse Electric & Mfg. Co. by the U. S. War Department, the Westinghouse company has announced.

Refrigerators are standard models of 6.2 and 7.2-cu. ft. capacities. Eighty of them are to be shipped to the Hawaiian Islands for installation in government quarters at Hickam Field, large army airport. They will be used in the homes of officers stationed at the field, and will complete the kitchen equipment supplied to the officers' families.

The remaining 29 of the 109 refrigerators ordered will be sent to the Sacramento air station, Sacramento, Calif.

New Household Service Manual on 'Special' Types Published

Just off the press and now ready for distribution is Manual No. 4 of the Master Service Manuals, bearing the title "Household Refrigeration Service Instructions on Special Makes and Models."

The information given in Manual No. 4 offers service instructions on makes and models of household electric refrigeration systems which have certain peculiarities in design and construction that make necessary specific service instructions other than those given in Manual No. 2 covering the more or less "standard" types of household refrigerating systems.

Detailed information is given on the 12 following makes of refrigerators (some of which are being manufactured and sold at the present time while others are no longer being manufactured or sold but are in use in thousands of homes): Absopure; Apex (also Wayne); Atwater Kent; Coldspot (Sears-Sunbeam); Copeland; Dayton (also Niagara); Fairbanks-Morse; Graybar; Iig-Kold; Iceberg; Liberty; Rice; Servel conventional; Servel hermetic.

Manual No. 4 discusses the specific characteristics of each different make and classifies the systems so that service complaints and operations can be easily referred to in Manual No. 2.

The different characteristics of each series of yearly models of the makes discussed are given in detail so as to simplify the work of the service man.

More than 125 pictures and drawings are included in the book to help the service man in understanding the operation, and in servicing the various machines discussed.

Manual No. 4 sells for \$1.00 and is published by Business News Publishing Co., 5229 Cass Ave., Detroit, publisher of AIR CONDITIONING & REFRIGERATION NEWS.

'Cat Swinging' Advice Was OK—As Long As Cat Lasted

CINCINNATI—When A. Chadburn, Jr., of the refrigeration department of Williams & Co., refrigeration and air-conditioning supplies jobber here, advised a customer to "swing a couple of alley cats" to find out if he had room enough in which to rectify some thermometers, he little knew what he'd start.

Not long ago, Williams & Co. sold some red-spirit thermometers to United Refrigeration Service, Columbus, Ohio. The thermometers were found to have the spirit separated, and Paul Oberly of the United firm asked Mr. Chadburn for advice on how to reunite the spirit column.

In addition to sending him the manufacturer's instructions, which suggested tying the thermometer on an 18 to 24-inch piece of string and swinging them, Mr. Chadburn also suggested the "cat swinging" test to see if there was enough room in which to perform the actual reuniting work.

Two days later, Mr. Chadburn received the following letter from Mr. Oberly:

"Dear Friend:
"As per your letter instructing us in the art of repairing thermometers with a disintegrated blood vessel, we have completed the experiment.

"Synopsis: We ran an ad for alley cats, and after procuring a first-class black alley cat, we proceeded to fasten a 6-inch rope on his tail (this 6 inches, with his 18-inch tail, gave us the required 24 inches). We swung him 10 rounds to the right, then five rounds to the left.

"We examined his eyes carefully after this test, and finding them to be very bloodshot, we decided it would be worth while to attempt it on a thermometer.

"Results: Due to satisfactory results being obtained in the cat experiment, with only 15 rounds of swinging, we decided that 50 rounds on the thermometer would secure excellent results; perhaps even settle the spirits down in the bulb so far as to make a very cold thermometer at all times.

"Well, everything went swell until the thirty-third round, and the thermometer slipped out of our string, and as far as we know it is still going.

"Really, it worked pretty well.
"United Refrigeration Service
"P. Oberly."

California Refrigerator Publishes Catalog

SAN FRANCISCO—California Refrigerator Co., refrigeration and air-conditioning supply jobbership headed by Clarence F. (Sandy) Pratt, has issued its catalog No. 78 consisting of 260 pages with 1,200 illustrations, and listing some 6,000 items.

Several sections, including those on gaskets and belts, have been considerably enlarged and brought up to date.

Additional features of the belt section are a list of belts arranged in order of outside lengths, and a series of special group offers of assorted belts. Assortment No. 1, for instance, consists of 146 belts for 390 different models of different refrigerators and air conditioners and also takes care of 153 different models of washers and ironers.

Special feature of the catalog is the 19 pages of list and net prices, designed to save the purchaser a lot of figuring.

New Arc-Welding Outfit Developed By G-E

SCHENECTADY, N. Y.—The art of welding special alloy steels and thin sections of metal has been advanced by the announcement of new atomic-hydrogen arc-welding equipment by engineers of General Electric Co. here.

The equipment is useful where a fusion weld is required, as it produces a uniformly strong weld with an exceptionally smooth appearance, the company claims.

Some common specific applications of the development are: building up of broken or worn sections of molds, tools, and dies; the addition of a differential metal for hard surfacing and other special requirements.

Room Thermostat For Cooling Marketed

ST. LOUIS—Production of a new line voltage room thermostat for air-conditioning service in stores, restaurants, and public buildings, and for use with unit heaters and coolers, has been announced by White-Rodgers Electric Co.

The new temperature control, an addition to the White-Rodgers line of "hydraulic action" controls, is available with or without thermometer, and is designed for heating or cooling service.

Range on heating types is from 55 to 85° F.; on cooling types, from 65 to 95° F.

Thermostat may be mounted on a standard outlet box.

U.E.I. Field Men In 2-Day Conference At Columbus

COLUMBUS, Ohio—A two-day conference of field men for Utilities Engineering Institute, Chicago, was held here recently under the direction of A. W. Seydell, district manager.

Representatives of the institute attending the meeting were: R. J. Sayre, Huntington, W. Va.; W. E. Cox, Akron, Ohio; R. E. Honey, Benton Harbor, Mich.; H. B. Dean, Lansing, Mich.; R. H. Barbour, Cincinnati; H. D. Keefer, Clarksburg, W. Va.; Earl Keefer, Dayton, Ohio; P. E. Doolittle, Erie, Pa.; John L. Conboy, Cleveland; A. C. Swisher, Detroit; and W. H. Nies, Columbus. Arthur E. Wake was a speaker.

Peerless Issues 1938 Product Catalog

CHICAGO—Peerless of America, Inc., has announced its 1938 catalog of air-conditioning products, containing complete descriptive, sales, and engineering data on the new Peerless high dispersion heat transfer surface.

Also listed are comfort conditioners, floor-type units, ceiling-type units, direct-expansion coils, water coils for heating and cooling, steam coils, and such allied products as thermal expansion valves, evaporative condensers, and heat exchangers.

Tables and charts for figuring air-conditioning installations and selecting proper coils are included in the 64-page catalog.

THE BUYER'S GUIDE

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The Peerless Water Saver (evaporative condenser) is easy to sell because you can show your customers definite and substantial savings.

Savings of 95% in condensing water costs for both air conditioning and refrigeration plants are common when the Peerless Water Saver is installed.

This unit will positively pay for both its initial cost and operating expense in a short while.

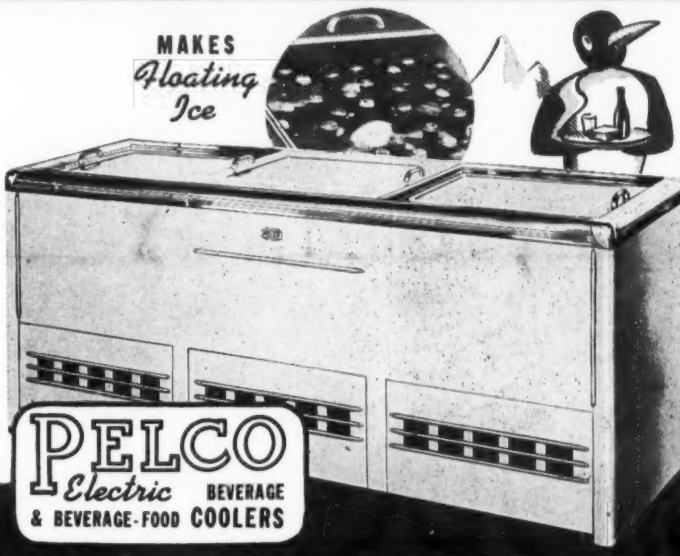
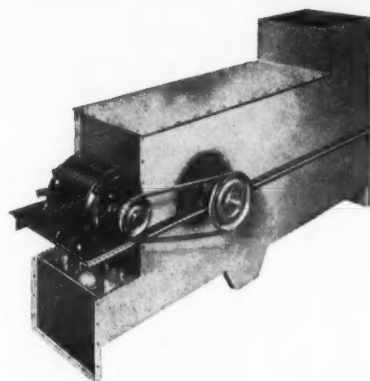
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ESTABLISHED IN 1912 AS THE PEERLESS ICE MACHINE CO.

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Main Factory—General Offices 515 West 35th Street Chicago
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BUY FROM YOUR LOCAL PEERLESS JOBBER

BUY PEERLESS FOR PERFORMANCE



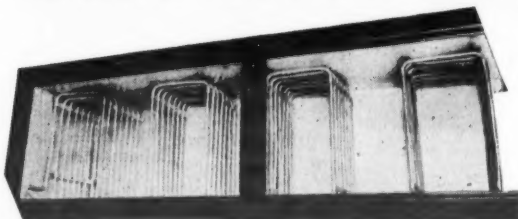
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Get additional profitable volume without extra overhead by selling PELCO beverage and beverage-food coolers! PELCO is "package-type"—simply plug it into any light socket. Your present salesmen can sell it to taverns, hotels, bowling alleys, restaurants, dairies—or any place that sells bottled beverages. There's a complete line, smartly finished in modern Pelco red baked enamel with stainless steel trim and chrome-plated hardware. Super-powered PELCO gives unequalled performance—precision manufacture for trouble-free long life—and full factory protection and help, backed by national advertising.

Refrigeration Division
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In Canada: UNIVERSAL COOLER CO. of CANADA, LTD. BRANTFORD, ONT.

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Tremendous Capacity
Unbelievable Fast Cooling
Compartments



Can be used For Wet or Dry Storage

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The beverage cooler your customers will invariably prefer. It is a proven fact that in any territory where the Ideal Speed Cooler is in operation, all competition is eliminated.

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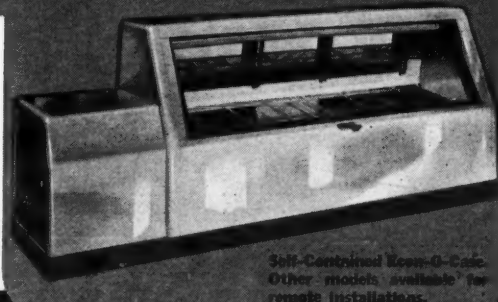
Ranco offers 32 Exact Replacements—ready for quick installation. No cutting. No fitting. Simply "toss out the old—slip in the new"! More than 200 of America's liveliest jobbers sell and recommend Ranco Replacement Controls.

Ranco INC.,
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THE BUYER'S GUIDE

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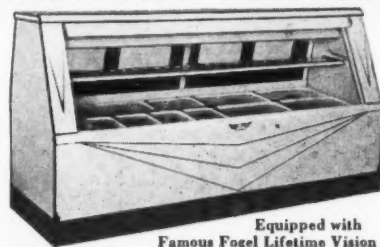
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Manufacturers of Refrigerated Display and Storage Equipment

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Fundamental Rules For Obtaining Ideal Air Conditions For Preservation of Foods Explained By Kalischer

STATE COLLEGE, Pa.—Fundamental rules to know and observe in obtaining optimum air conditions, particularly with respect to proper relative humidities, for the preservation of foodstuffs were explained by Milton Kalischer of the refrigeration engineering department of Westinghouse Electric & Mfg. Co. in his talk on "Air Properties and How They Are Controlled," at the recent Food Conference held here under the sponsorship of the American Society of Refrigerating Engineers.

While Mr. Kalischer's paper was devoted principally to describing air properties, a good part of it was given over to descriptions of what happens to air when it passes over cooling surfaces of various types, and thus offered some fundamentals to be followed in designing and installing equipment for the commercial storage of foods.

"The word air is commonly used to refer to the atmosphere of the earth. It is not a single chemical substance but a mixture of a considerable number of gases, mainly nitrogen and oxygen, which occur in the ratio of 78% nitrogen and 21% oxygen," Mr. Kalischer explained.

GASES IN AIR

"The remaining 1% is made up of a variety of gases, among which are argon, hydrogen, neon, helium, krypton, xenon, and carbon dioxide. Some of these minor constituents are of importance and others not. Argon, for instance, which forms about .94% to 1% is widely used in the filling of incandescent lamps and is responsible for a tremendous saving in electricity due to the more efficient lamp that results from its use.

"Hydrogen is of very wide use throughout the chemical industry. Neon is used in the familiar red tubular lamps so widely used in signs. Helium is used for filling balloons and is at present the object of controversy relative to its being sold to Germany for zeppelin use as the United States possesses the only commercially exploitable sources. Krypton and xenon so far as I know have no commercial importance, though they, too, if commercially available would enable additional improvements to be made in electric light bulbs.

CO₂ IMPORTANT

"Carbon dioxide, while only present in the atmosphere in small quantities, is a tremendously important material. It is given off by carbon, present in coal or oil, burning in air. In addition it is supplied by the decay and fermentation of animal and plant bodies, volcanic eruption, and it is present in the respiration of animals.

"Offhand, it would seem like these sources would steadily increase the quantity of carbon dioxide in the air, but this is not the case. Nature has provided a very nice balance by causing plants to absorb carbon dioxide from the air. In fact, the carbon dioxide in the air is the only source of carbon that the plants have and without carbon it would not be possible to have any organic compounds.

WATER VAPOR

"All of the coal and oil that we have today have been formed as the result of plants absorbing carbon dioxide from the air in past ages, and through natural processes ultimately bringing it into a form in which it is usable for us as fuel. We in turn burn it and combine the carbon back with oxygen to form carbon dioxide. At the same time as the plants absorb carbon from the carbon dioxide the oxygen is rejected and left available for uniting with more carbon, completing the cycle.

"The list of gases just discussed in general constitute what is known as air, but the atmosphere, in addition to these gases, contains another material, that is water vapor, and from the standpoint of the keeping of food under refrigeration the water vapor is far more important than all of the minor constituents discussed.

"Looking at the matter rather unscientifically, air can be thought of as having the properties of a sponge,

always greedy to absorb water up to a certain point.

"Like a sponge the amount of water that the air can absorb is limited. However, this limit is variable, and depends entirely upon temperature. Between a temperature of 40°, which is a reasonable refrigerating temperature, and a temperature of 105°, the amount of water that can be absorbed into the air varies in the ratio of 10 to 1.

"If air at any given temperature, and saturated with moisture, is cooled to a lower temperature the water in excess of what can be held at the new temperature must precipitate out.

"Water is present in the air in the form of steam, a colorless gas, as the colorless appearance of the jet of steam just emerging from the spout of the tea kettle demonstrates. The white cloud out beyond this colorless portion is not steam but steam that has condensed into water vapor due to cooling, and has collected in fine droplets that are visible to the eye.

"Steam coming from the kettle so briskly does not ultimately fill the

lute humidity of the 80° air half saturated with moisture in our illustration is .01113 lbs. of water per pound of dry air.

"When the quantity of moisture actually in a given sample of air is expressed as a fraction of the quantity that could be contained if saturated at the same temperature, the result is known as relative humidity.

"You have all seen advertisements depicting the interior of a home as being dry as the Sahara Desert in the winter time. This comes about by cold outdoor air with low moisture holding power being warmed in the house.

"Suppose that the air outdoors is 40° and suppose further that it is half saturated, in other words, it has .0026 lbs. of water per pound of air. Suppose it is heated up to 80° as it passes into the house. The 80° air could hold .022 lbs. of water. In other words, about 8½ times as much.

"Consequently, the air in the room is only about one-eighth saturated or has a relative humidity of .0026 ÷ .022 = 12%. As the outdoor temperature goes down this effect becomes much more marked and if the temperature is very low outside the relative humidity in the house may go down to below 10%.

'AIR IS GREEDY'

"Now this air might be thought of as being always greedy to absorb moisture to resaturate itself, and it takes some moisture from the wood in the furniture, from the mucous membrane of our nose and throat, and other places that have available moisture. Putting some of the moisture back into the air with a humidifier renders the air less greedy and consequently it absorbs less from

Difficult Phases of Refrigeration Explained Simply

To those who have not had the benefit of a scientific or technical education, there is much in the technology of refrigeration that is difficult to understand, and one of the most difficult phases of the science for the uninitiated to comprehend is the relation of water vapor in the air to varying temperatures.

It is difficult to explain such a matter lucidly without so oversimplifying the explanation that it loses its significance; however, in his paper Mr. Kalischer presented all the necessary facts in a manner that is easy to read and to understand, and in addition gives some practical examples of the workings of the theory in practical refrigeration applications.

whole room with visible vapor because as this condensed moisture gets out into the main body of room air it reevaporates and once more becomes steam and therefore invisible.

"There are other illustrations of this nature that are familiar to all of us. The prevailing winds in the United States are from the northwest and are saturated with moisture. Coming over the Rocky Mountains these westerly winds rise and are cooled. This cooling effect causes some of the moisture to be precipitated out in the form of rain. This accounts for the fact that the western slope of the Rocky Mountains in general is supplied with abundant rain while the eastern slope and the plains east of the mountains get far less.

CONDENSATION

"Another illustration is the condensation that occurs on the outside of a pitcher of ice water. The air in the immediate vicinity of the pitcher is cooled down to such a temperature that the moisture contained in the air can no longer be kept in the form of steam and the excess precipitates out.

"Suppose that we have air at 80° that is saturated with moisture. If this air were cooled to 60° it could only hold half of the moisture that it did at 80°. The remaining half of the moisture would precipitate out on the cooling surfaces.

"Suppose that all of this precipitated moisture was carefully removed and the air then warmed back up to 80°. It would now only contain half of the moisture that it did initially, in other words, only half of the quantity that it was capable of holding. The air is now one-half saturated, or is said to have a relative humidity of 50%.

"We should carefully distinguish between absolute humidity and relative humidity. Absolute humidity is a given sample of air and may be expressed in various units. The abso-

lute humidity of the 80° air half saturated with moisture in our illustration is .01113 lbs. of water per pound of dry air.

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(Concluded on Page 17, Column 1)

SUPERIOR


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Manufacturing a complete line of DIAPHRAGM PACKLESS VALVES, MANIFOLDS, ACCESSORIES and FITTINGS for the Refrigeration and Air Conditioning Industry.

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FRENCH SMALL TUBE BRANCH
General Offices: Waterbury, Conn.

Determination and Maintenance of Proper Relative Humidity Is Important For Storage of Foods

(Concluded from Page 16, Column 5)
stored therein becomes greater and greater and this ultimately leads to an unusable condition due to drying out. This is discussed in more detail by Logan Lewis. (See report on Mr. Lewis' paper in the July 6 issue.)

"On the other hand, as the humidity is raised the rate of growth of bacteria and mould on the surface of the preserved food gets greater and greater and this must be offset by lowering the temperature. Consequently these two factors are closely related to each other and vitally important as you know in refrigeration.

"In addition to these two, air velocity is of importance because in combination with humidity it governs the rate of evaporation from the surface of the food. Given a set of conditions relative to temperature and humidity, evaporation will go on more rapidly if the air is moving briskly across the surface of the food than if it is moving slowly.

"In addition to the main factors, temperature, humidity, and air motion, there are others that are important under some conditions. These are dust, carbon dioxide, ethylene, the air, ultra violet radiation.

DUST CARRIES BACTERIA

"Dust is important because a good deal of the air-borne bacteria is carried on dust. A dusty location contributes to initial contamination of the food. Obviously food handled in dust free atmosphere has less initial contamination.

"Carbon dioxide and ethylene are used for improved preservation of fruit of certain kinds and ozone and ultra violet radiation are used in a refrigerator to assist in the control of bacteria and mould, as both of them have a powerful lethal action on surface contaminations of this nature.

"So far as the storage of food is concerned the almost universal method of controlling temperature and humidity is by direct refrigeration.

"As water-laden air passes over a coil containing refrigerant it is cooled. The amount of cooling depends upon two factors, namely, the ultimate temperature desired and the ultimate humidity desired.

MEAT STORAGE ROOM

"Consider a meat storage room requiring a refrigeration effect of about 1 ton and kept at about 40° F. by means of air passing over a finned coil. So far as the cooling of the air in the box is concerned we have quite a few choices. We can pass a small quantity of air over the coil and cool it very cold, or we can pass a larger quantity of air over the coil and cool it less.

"Suppose that we cool the air 5° as it goes through the coil. The temperature on the inlet will be 40° and on the outlet 35°. This 35° air coming off of the coil will quickly mix with the air in the room and the net temperature might be 39½° over the rest of the room.

"Suppose that we were to double the quantity of air passing through the coil. If we did this the temperature drop through the coil would be half as much, in other words 2½°, and the air would come off of the coil with a temperature of 37½°. This air again would quickly mix with the room air and the ultimate effect on the room temperature would be about the same as previously.

"Going the other way we might cut the air quantity down to a quarter as much as we had the first time and cool the air 20°. In this case the results would be similar to those previously mentioned, namely, the air temperature in the room would be about the same, though there would be a tendency for air to be

colder in the neighborhood of the coil, and warmer elsewhere, though the average temperature would remain about the same.

"If the temperature were all that we were interested in it would not make a great deal of difference from the standpoint of food preservation just which combination we chose. The results so far as box temperature were concerned would be the same.

HUMIDITY CONTROL

"However, we have the ever present matter of humidity control to consider, and this factor has a big bearing on our choice of temperature drop through the coil. There is one factor that must be kept in mind in connection with both temperature and humidity and that is, that the heat removed by the cooling coil must come from some place as must the moisture removed by the coil.

"In connection with the heat removed, it comes ordinarily largely from the leakage through the walls of the box, and also from any lights that are on in the room, people working on it, or warm food put in to the box.

"In the case of humidity, the moisture comes largely from the food, though it also comes in from door openings and respiration of people in the room.

BALANCE OF COIL

"Consequently, if a coil takes out a great deal of water it must be getting a great deal of water somewhere or it would quickly reduce the relative humidity in the room. As the room relative humidity goes down it will take out less and less water until there is a balance between the water taken out by the coil and the humidity supply in the room.

"A couple of problems will illustrate this point. Suppose we have two conditions, one in which the box has a temperature of 40° and 60% relative humidity, and one in which the humidity is 80%. Let us assume that we cool the air down several different amounts, but in each case let us assume that the relative humidity of the air leaving the coil is 85%. This figure varies considerably with the type of coil and with operating conditions, but it is fairly typical and satisfactory for the sake of illustration.

MEASURING MOISTURE

"Let us take cases in which the air is cooled 2½°, 5°, 10°, and 20°, and investigate the amount of moisture that is removed per pound of air circulated through the coil under these different conditions.

"In connection with this we will use a new unit for measuring the amount of moisture, namely, the grain. A grain is simply one seven-thousandths of a pound; in other words, 7,000 grains make up a pound. This unit is used because the quantities involved are rather small and if we use pounds we would have decimals with a string of zeros behind them and these would be rather difficult to handle.

"The grain is the unit of measure in pharmaceutical work. Thus 1 lb. or 7,000 grains of the active material in an aspirin tablet would be sufficient to make 1,400 aspirin tablets.

"The moisture content per pound of the air entering the coil is 22 grains per pound, and the air leaving the coil under the different conditions mentioned has moisture contents, respectively, of 27.3, 25.2, 20, and 12.5 grains per pound.

MOISTURE REMOVAL

"Notice that in the first two conditions the outlet moisture content is higher than we assumed for the inlet air. Obviously this condition cannot exist, and the relative humidity of the air leaving the coil must be lower than the assumed value. Under these conditions very little moisture will be removed from the air.

"What will happen under these conditions if the humidity load in the box is appreciable, is that the assumed relative humidity of 60% will gradually build up to a higher value, such that moisture will begin to come out from the coil.

"However, if you cool the air either 10 or 20° the moisture content of the outlet air is considerably below that of the inlet air, and we will

remove in the case of 10° cooling two grains of moisture, and in the case of 20° cooling 4½ times as much, or nine grains.

"If we assume on the other hand that the moisture content of the air was sufficient on the inlet side of the coil to make a relative humidity of 80%, then the initial moisture content will be 29 grains, and under all of the outlet conditions assumed some moisture will be taken out on the coil. This will probably result in the relative humidity going down in the box some unless the humidity load in the coil is high.

RAISING HUMIDITY

"Besides keeping the cooling to a small number of degrees, there is a further means sometimes employed to raise the humidity in a cabinet in case the relationship between the load and the coil is not such as to keep the humidity up to the desired point, and that is the inclusion of a humidifier that evaporates water into the air.

"These problems illustrate in general the relationship between temperature drop and resulting humidity in the box. Four other factors enter into this picture in order to make it complete.

"One is the area of the cooling surface, one is the temperature of this surface, the third is the actual shape and arrangement of the coils, and the fourth the air velocity.

"What effect does changing these factors have? As the area of the cooling surface gets greater the amount of cooling will increase. As the temperature of the surface gets lower the amount of cooling will increase, and as the air velocity gets greater the amount of cooling will increase.

"The shape and arrangement of the coils enter into the picture because of the fact that other things remaining constant they have a bearing on the air velocity, that is, the same number of cubic feet per minute of air going through a single row of coils will have a lower velocity than if the same number of cubic feet per minute were put through the area which would be formed by stacking the same coil surface into several layers.

IDEAL ARRANGEMENT

"It would appear from this that the ideal arrangement would be to take the coil and stack it up as thickly as possible so as to improve its performance by decreasing the face area and thus increasing the air velocity through it.

"However, if natural convection is relied upon for circulation this would not happen because the added restriction of several layers would tend to cut down the velocity instead of increasing it.

"Likewise there is a limit to the practical increase in cooling surface, because cost becomes prohibitive and space is wasted. Excessively low temperatures of the cooling surface likewise are not practical because of the adverse effect on machine efficiency, and the fact that whatever moisture is taken out of the coil will freeze up on the surface, and interfere with circulation.

"Consequently from a practical standpoint experience indicates certain reasonable balances between the air velocity through the coil and the temperature of the coil and the surface area. This relationship is governed by operating conditions and the desired relative humidity in the cabinet.

"It is probably not too inaccurate to say that in general higher humidities are desired rather than lower humidities, for due to cost limitations there is a tendency to use coils that are too small in a box, thus resulting ordinarily in an excessive cooling of the air and consequently excessive dehydration.

"Most boxes used for the preservation of food operate above the freezing point and for this reason if the air is not cooled too much as it passes through the coil, either a small quantity of frost or no frost at all will collect on the coil. If frost does collect on the coil it is frequently possible to arrange the cycling of the machine so that the machine runs long enough and then stays off long enough that defrosting takes place each cycle.

"However, if the box temperature is low, as for the preservation of frozen foods, then other means have to be provided for defrosting.

"In general, there are two ways of cooling the air. One is by means of ice and the other by means of cooled surfaces. These cooled sur-

faces may in turn be directly cooled by refrigeration or indirectly cooled by cold brine.

"In connection with the latter there are two general types of cooling surfaces for boxes. One is cooling surfaces with natural air circulation and the other is cooling surfaces with mechanical circulation.

"While the former method used to be the only one in use the latter scheme is coming more and more into favor because of the compact nature of the installation that is made possible. The reason for this is that the coils can be stacked up rather thickly and reliance placed on the fan to circulate enough air through it.

"However, when natural circulation is relied upon the coil must be made very large and very thin.

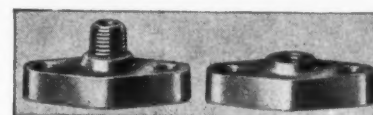
"One question that has probably come to all of you is the comparison between ice and mechanical refrigeration as a means of keeping temperature and humidity at a satisfactory value in a food storage box.

"For satisfactory food preservation temperatures between freezing and 40° are ordinarily necessary. Such temperatures as these are practically impossible with ice, even a completely loaded and well iced box will not have a temperature much below 50°, and when the charge of ice runs low, temperatures as high as 60° may result.

"The argument, however, that is given in favor of the ice cooling, particularly with regard to domestic refrigerators, is that the wet surface of the ice keeps the humidity up.

"The actual character of the surface has little to do with the resulting conditions in the box. The only thing that matters is the extent to which the air is cooled passing over the cooling surface and it is readily possible to get the same conditions with mechanical cooling as with ice so far as drying is concerned, and tremendously lower temperatures from the standpoint of food preservation, as bacterial growth goes up very rapidly with temperature."

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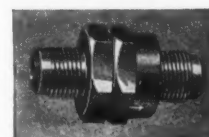


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Foreign News

Two-Week's Educational Program Features First Australian Refrigeration Congress

Refrigeration Engineering & Service Co., Ltd.
The Senior Service Organization
Waltham Buildings
24 Bond St., Sydney

Publisher:

The first Australasian Congress of Refrigeration and Dairying was opened on Monday, May 16, by A. G. Cameron, Acting Minister for Commerce, who mentioned the vital part dairying plays in the economic life of this country.

Mr. Cameron said that in 1937 butter exports returned about \$9,000,000 to Australia and he thought it most appropriate that the refrigerating engineers and dairy managers should have combined to stage this congress.

The refrigerating engineer with his substantial achievements and constant researches was vital to many of Australia's most important industries.

This speaker was followed by the Hon. A. D. Reid, M.L.A. Minister for Agriculture, and A. E. Southey, Esq., Principal of Hawkesbury College.

Then followed five-minute addresses from: Hon. M. P. Dunlop, M.L.C., P. C. Boxall, P. C. Brasche, H. J. Foley, A. E. McCarthy, Wm. Sinclair, A.M.I.E. (Aust.) M.I. Mar. E. London, representing the British Association of Refrigeration (London), W. Taylor, Commissioner for the Dominion of New Zealand, representing the New Zealand Association of Refrigeration, Dr. J. R. Vickery, representing the Council for Scientific and Industrial Research Aust.

Numerous visitors from overseas, New Zealand, Tasmania, Victoria, Queensland, Western Australia, and

South Australia were met by the president, secretary, and members of the Institute of Refrigerating Engineers of New South Wales at the Hotel Australia on Monday and welcomed to the congress, after which a call was made on the Rt. Hon. The Lord Mayor of Sydney who entertained the party.

During the afternoon tea was provided for the visitors and an inspection made of machinery exhibited at the R. A. S. Showground, Sydney.

In the evening a lecture, which was largely attended, was given by Dr. J. R. Vickery, W. A. Empey, and W. J. Scott of the Food-Preservation Research Laboratory C. S. & I. R. entitled "Notes on the Preparation, Cooling, and Transport of Export Chilled Beef."

On Tuesday the following papers were read at the Conference Hall at the Showground:

"The Refrigeration Triangle" by W. Sinclair, A.M.I.E. M.I. Mar. E. (London).

"Insulation of Refrigerated Premises" by A. S. Mitchell, M.I.M.E., A.M.I.E.E., etc., and Hon. Secretary, New Zealand Association of Refrigeration.

"Power Transmission Relative to Refrigerating Machinery" by Mr. E. A. Molesworth.

"Some Factors Affecting the Keeping Quality of Butter in Cold Storage" by D. W. J. Wiley of the Dept. of Scientific & Industrial Research, New Zealand.

"The City Milk Plant and Its Equipment" by E. A. Shephard, M.I. Mech. E., etc., of the British Association of Refrigeration (London).

"Air Conditioning in China" by J. Fox of York Ice Machinery Corp.
"Humidity in Refrigerating Practice" by J. S. Liddle, B.E. M.I. Ref. E.

FOOD STORAGE PRACTICE

On Wednesday the following interesting papers were read:

"Operations of the Government Cool Stores, Melbourne, Victoria," by J. Hepburn, A.I.R. (works manager and chief engineer, government cool stores, Melbourne).

"The Orchard Cool Store" by W. E. Dobney, A.I.R., president of the Australian Institute of Refrigeration, Melbourne.

"Cold Storage of Oranges" by Willis J. Williams, B. Sc., supt. of markets, Sydney. "Fruit Cold Storage" by A. Patchell, chief engineer, Batlow Cool Stores, New South Wales.

"The Factory Inspector and His Relation to Industry" by T. Gordon Bennet (Supt. Inspector, Dept. of Labor and Industry, New South Wales).

"Modern Trends of Refrigerating Equipment" by J. J. Budge, B.E., M.I. Ref. E.

"Refrigerating Plant in Connection with Ice Cream Manufacturing Installations" by H. W. Pasteur, British Association of Refrigeration, read by A. R. Wikner.

"The Application of Refrigeration to the Development of Australian Fisheries" by F. J. Haase (Sea-fresh Sea Foods, Melbourne).

"The Effects of Pre-cooling of Fruit in Relation to its Storage Life" by Dr. S. A. Trout and G. D. Tindale (C.S. & I.R.).

"Killing and Freezing Lambs by the Chain System" by H. F. Dean, A.I.R. (supt. engineer, Sims-Cooper Freezing Works, Geelong).

300 ATTEND

On Thursday the official luncheon was held at the R.A.S. Showground and was attended by about 300 visitors and members.

Mr. Searl, president of the Australian Institute Dairy Factory Managers and Secretaries, presided and after the Royal Toast called on Mr. Telfer, president of the Institute of Refrigerating Engineers, to propose the toast of the visitors, which was duly honored. Visitors from the various states and overseas responded. The toast of the press was proposed by Mr. Storer, who mentioned valuable work done by country and city papers, but deplored the scant knowledge of affairs here provided to overseas journals.

After drinking the toast, Mr. Todd of the Sydney Morning Herald responded.

CONDITIONER NEED CITED

Papers were then read as follows: "Neutralization of Cream for Butter Making" by Dr. F. H. McDowell, D.Sc. of the Dairy Research Institute (N. Z.).

"Stainless Steel; and, in Particular, Stainless Steel Tubes" by Dr. van R. Kool.

In the evening A. N. Campbell, A.I.M.E., M.I. Ref. E., delivered a paper in which he said:

"Air conditioning of all Australian railway cars is an inevitable future development. The type of air conditioning adopted in Victoria automatically maintains the desired temperature, irrespective of the conditions outside.

"While the air from the ordinary carriages is re-used, all that from smoking compartments is dumped. It is difficult to get rid of nicotine oil from the smoke of a cigar or pipe. The oil taints the filters and leaves an objectionable odor in the compartments.

"Mr. Clapp has stated that Victoria will not build any carriages for country services without air conditioning. The development of air traffic is obvious, and the standard of comfort in our railway system will need to be considerably improved if we are to maintain railway business against the growing competition from the air."

On Friday a paper entitled "A Comparison of Direct and Indirect Methods of Air Conditioning" was read by D. U. Macintosh, B. Mech. En., B.E.E., etc., followed by one "The Diesel Engine" by F. C. Bishop, M. I. Ref. E.

The delegates and visitors from overseas and interstate accompanied by the executive officers of the institute were entertained on a harbor excursion as guests of the Producers Co-Op. Distributing Society and refreshments were provided.

The Smoke Social held in the evening was very well attended and

marked the conclusion of the serious side of the congress the second week being devoted to inspections of plants, etc.

Short speeches were the order of the evening, and the organizers of the conference, particularly Mr. Goodman, the Hon. Sec. of the institute, were heartily thanked and praised for their splendid efforts in making the congress possible, and running it in such a capable manner.

ENGINEERS LAUDED

Thomas Carrigan, past president, in responding to a toast, in which he was claimed to be the most untiring and popular member, said that it was his most cherished wish to gain for engineers their proper place in the world. He mentioned that actually engineers are the "King Pins" of industry, and that without them the world would collapse. Even during the War, he said, the engineer had to provide the necessary power for ships, etc., and yet got no credit for anything. In conclusion he said that he hoped a World Congress would be held in Australia at a not

too distant date.

The second week of the congress started with a well attended visit to the factory of the American Delicacy Co., Redfern, on Monday morning where the visitors saw ice cream during all its stages of manufacture and were given samples of the finished produce.

During the afternoon the party visited the Mangrove Belting Co., Lane Cove.

On Tuesday an inspection was made of the Fresh Food & Ice Co. works at Harbour St., Sydney, and in the afternoon a harbor trip was made in the launch Premier.

All day Wednesday was spent in visiting the City of Newcastle, where a civic reception was tendered by the Lord Mayor, after which the party inspected the Broken Hill Proprietary's Steel Works.

Thursday morning was spent viewing the N. S. Wales Banana Marketing Board Cool Rooms, etc., and the afternoon the Kent Brewery of Tooth & Co., Ltd., was inspected and the visitors sampled its products.

A. R. WIKNER

Exports of Refrigerators During 1937

Countries	Electric Household Refrigerators		Electric Commercial Refrigerators Up to 1 Ton		Parts for Electric Refrigerators	
	Number	Value	Number	Value	Number	Value
Austria	422	\$ 29,875	61	\$ 3,274		\$ 14,600
Azores and Madeira Islands	16	1,366	2	584		511
Belgium	3,124	215,499	1,267	89,979		127,860
Bulgaria	61	5,150	25	4,341		1,849
Czechoslovakia	200	8,110	7	1,271		59,288
Denmark	2	656	65	3,016		20,409
Estonia	2	163				
Finland	294	22,848	245	21,414		43,419
France	11,893	749,699	3,478	221,558		549,043
Germany	19	1,650				3,915
Gibraltar	70	5,999	1	148		1,511
Greece	216	21,887	212	29,562		13,609
Hungary	32	3,535	4	442		378
Iceland	1	64				10
Irish Free State	484	54,179	256	20,589		5,187
Italy	992	85,311	200	16,983		36,996
Lithuania	45	4,469				4
Malta, Gozo, and Cyprus	80	6,110				771
Netherlands	1,847	135,052	592	50,012		74,887
Norway	2,597	205,363	248	32,499		73,727
Poland and Danzig	4	288	2	707		325
Portugal	427	36,867	88	12,750		9,559
Rumania	580	47,051	5	3,550		10,008
U. S. S. R. (Russia)	200	18,966	22	3,680		90,230
Spain	7	761				140
Sweden	4,141	267,314	837	63,797		250,366
Switzerland	964	78,197	11	369		57,398
Albania	3	329				
United Kingdom	13,514	790,180	10,765	557,820		928,012
Yugoslavia	82	5,329				467
Canada	14,071	1,043,959	1,825	199,646		1,152,795
British Honduras	30	1,174				327
Costa Rica	538	51,668	24	6,471		4,546
Guatemala	438	40,376	34	7,060		4,633
Honduras	152	16,223	4	947		3,147
Nicaragua	73	6,977	8	898		766
Panama	1,233	140,946	168	31,441		37,925
Salvador	398	39,645	34	7,155		3,253
Mexico	7,325	588,714	492	75,337		69,512
Newfoundland and Labrador	265	22,158	24	3,686		1,905
Bermuda	567	54,946	89	19,096		15,410
Barbados	256	20,375	13	1,935		3,662
Jamaica	179	17,826	42	8,118		6,238
Trinidad and Tobago	555	50,610	29	4,867		3,862
Other British West Indies	208	20,396	14	2,027		4,690
Cuba	6,842	552,290	706	74,746		119,918
Dominican Republic	414	36,342	32	7,303		2,563
Netherlands West Indies	916	88,765	75	9,857		10,379
French West Indies	118	10,087	5	520		567
Haiti, Republic of	117	9,415	13	1,454		689
Argentina	5,020	254,985	1,684	138,229		508,989
Bolivia	181	16,728				143
Brazil	12,291	994,741	1,280	105,854		134,380
Chile	748	68,046	211	20,247		12,455
Colombia	3,250	306,595	212	31,595		27,122
Ecuador	226	19,999	13	1,333		1,129
British Guiana	207	14,175	2	376		658
Surinam	10	716	1	311		202
Paraguay	228	20,691	16	3,670		1,116
Peru	983	86,784	99	12,322		16,144
Uruguay	1,620	143,626	317	35,742		38,721
Venezuela	4,325	407,887	292	57,452		20,919
Aden	44	5,037	3	441		468
Saudi Arabia	14	1,989				1,182
British India	2,962	228,618	287	35,942		78,733
British Malaya	2,127	186,422	173	22,572		27,815
Ceylon	541	44,688	4	374		5,147
China	2,083	160,239	50	6,181		18,242
Netherlands India	2,106	174,059	115	13,639		30,353
French Indo-China	997	82,337	25	7,658		28,351
Hong Kong	560	44,901	38	5,286		7,231
Iraq	148	11,517	5	1,510		646
Japan	271	25,277	176	25,396		77,996
Kwantung	100	7,490	39	5,465		3,502
Palestine	1,801	128,012	122	18,405		22,472
Iran	13	1,250	2	188		32
Philippine Islands	1,598	140,921	211	30,602		29,152
Siam	362	28,537	9	927		1,066
Syria	325	25,945	73	11,068		2,145
Turkey	2,772	213,461	431	46,331		20,087
Other Asia	101	17,665	11	1,990		849
Australia	332	23,842	29	3,495		38,629
British Oceania	93	8,275	9	1,341		528
French Oceania	38	3,270	1	78		687
New Zealand	2,860	224,478	927	72,736		85,544
Belgian Congo	433	32,914	8	494		3,015
British East Africa	427	35,873	22	2,071		4,815
Union of South Africa	31,005	2,341,984	1,303	110,361		263,594
Other British South Africa	520	37,844	15	1,915		4,753
Gold Coast	244	22,644	3	410		3,864
Nigeria	177	15,415				1,321
Other British West Africa	20	2,198				288
Egypt	901	78,562	115	13,728		25,608
Algeria	1,396	101,306	160	14,168		19,173
Tunisia	1,107	81,779	111	11,154		9,197
Madagascar	52	5,319	2	236		435
Other French Africa	386	34,074	3	636		2,055
Italian Africa	5	534				92
Liberia	27	1,957				149
Morocco	1,596	115,395	32	3,873		7,189
Mozambique	1,169	104,750	39	4,158		8,756
Other Portuguese Africa	29	2,727	5	826		330
Canary Islands	12	979				425
Total	167,862	\$12,754,616	30,709	\$2,483,695		\$5,419,495
Shipments to Hawaii	7,899	749,303	546	95,458		73,743
Puerto Rico	3,841	357,853	628	94,696		46,891
Virgin Islands	34	3,729	13	2,804		1,309

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Engineering

How Spring Tension Fastenings Are Used In Refrigerator Cabinet Construction

CLEVELAND—The Speed Nut division of the Tinnerman Stove & Range Co. here has recently announced additional new developments in spring tension fastenings known as speed nuts, to improve the assembly of electric refrigerators, electric ranges, and air-conditioning cabinets.

The speed nut is a spring tension nut replacing the conventional threaded nut and lock washer. One part takes the place of two. It holds assembly parts together under firm spring tension.

The object is to eliminate vibration, prevent loosening of parts, reduce the amount of material, provide a method of absorbing expansion and contraction, prevent enamel damage, and make possible lower assembly costs.

Fig. 1 shows the new improved standard single speed nut as applied to a machine screw, a sheet metal screw, and a rivet. These speed nuts are made in many different sizes and shapes, including rectangular, round, "U" shape, "L" shape, and many others. Many are also made in multiples of two or more for faster and more economical assembly.

One feature of the speed nut is its kinetic energy which, by virtue of its spring tension, intensifies its grip upon the screw, bolt, or rivet as the pull or strain is increased.

Fig. 2 illustrates a "U" shaped speed nut designed for the assembly of hollow bodies such as refrigerator doors and cabinets. This speed nut is slipped over edge of flange. It has an extension in its longer leg in order to make it snap into register with the bolt hole.

It eliminates tapped strips and produces a resilient, yet positive fastening. Its shorter leg permits tight fastening of breaker strip to door panel for perfect sealing.

Fig. 3 illustrates a special channel-shaped speed nut designed for hinged assembly of refrigerator doors. Of

spring steel construction, it is sprung into place prior to assembly in order to serve as reinforcement for door panel and at the same time eliminate the use of welding or tapped plates.

Formed slightly over square, this speed nut holds itself securely in the box flange of any door or similar structure.

Fig. 4 illustrates a double speed nut used in blind location assembly. It engages two separate screws, eliminates lock washers, increases the rigidity of the assembly, and eliminates tapped plates or strips.

Heat Exchanger Institute Publishes Steam Jet Data

NEW YORK CITY—Publication of a new section of its standards, covering steam jet ejector and vacuum cooling, has been announced by C. H. Rohrbach, secretary of Heat Exchanger Institute here.

The standards consist of three parts: (1) steam jet ejectors; (2) test code for steam jet ejectors; and (3) steam jet vacuum refrigeration equipment. All three parts are bound in one book, priced at \$1.

Part 1 covers nomenclature, operating principles, types of assemblies, capacity and standard accessories, and materials of construction of steam jet ejectors. Part 2, test code, covers motive steam, condensing water, vacuum and pressure measurement, capacity measurement, performance tests, diagrammatic arrangements of apparatus for conducting various tests, standard air nozzle orifices, and curves on steam flow and air water vapor mixture data.

Part 3 covers nomenclature, definitions, performance, construction, standard units, and special types of steam jet vacuum refrigeration equipment.

'Parkerizing' Process Improved and Cost Of Operation Cut

DETROIT—Research laboratories of Parker Rust-Proof Co. have just announced a new Parkerizing process said to combine all effectiveness of the old method with some important new qualities which result in increased efficiency and lower cost of application.

Processing time, for instance, has been cut from the 60 to 90 minutes formerly required to about 30 minutes, it is claimed. Operating temperatures, too, are said to have been reduced, the new processing solution reacting at 180° F. instead of the 210° F. necessary in the old process. Both of these improvements reputedly result in greater economy of operation.

In addition, the shortened processing time automatically reduces the size and cost of processing tanks necessary to handle any stated volume of work. This in turn reduces installation costs, a considerable item in the case of larger manufacturers.

The improved liquid chemicals used in the new process develop less sludge in the processing tank, it is claimed, and produce a finer grained, smoother coating.

New Models Introduced By Superior Valve Co.

PITTSBURGH—A line of two-way and three-way diaphragm packless valves, available with either S.A.E. flare or sweat tube solder refrigerant line connections in sizes from 1/4 to 1/2-inch o.d. tube, is now being manufactured by Superior Valve & Fittings Co. here, reports K. M. Newcum, the company's sales manager.

These valves have a multi-disimilar metal diaphragm consisting of three different metals—phosphor bronze, stainless steel, and a soft phosphor bronze.

Seal between the body of the valve and the outside atmosphere is provided with a bolted bonnet, which is easily removable for diaphragm replacement or inspection by removing the six slotted head screws. This permits the service man to service the valve on the job, without the use of unusually large tools. A screwdriver, it is said, will be sufficient.

Diaphragms are of generous proportions, resulting in longer diaphragm life, the makers believe.

Valve is made in two sections, with a knife-edge joint between the auxiliary body and the main body, which is the lower part of the valve. Purpose of this feature is to enable the service man to remove the entire internal assembly from the valve body, to avoid damaging the internal parts when applying heat to valve connections in soldering the refrigerant lines.

Valve stem guide, which is interposed between the auxiliary and main bodies of the unit, is of the self-aligning type, allowing the stem to align itself with the valve seat. This construction permits the provision of a radius on the valve seat which provides the effect of a ball and cone seat, which is said to make the valve easy to close.

Diaphragms may be removed with refrigerant in the system and in the valve, the company claims. This is made possible by small pressure cups which are interposed between the valve stem and the valve stem cap. Outside pressure cup is formed to provide a constant contact with the reamed surface of the auxiliary body, preventing the pressure from reaching the diaphragm chamber.

New 'Jackmaster' Has 2-Wheel Lifting Unit

WATERTOWN, Mass.—A new two-piece combination for lifting and handling materials has been announced by Lewis-Shepard Sales Corp. here.

Known as the "JackMaster" system, the new combination consists of a two-wheel lifting unit which fits into a skid for transporting loads. Lifting unit operates from right or left through a 170° arc, it is claimed, and has dual roller bearing wheels with metal or rubber tires. Skid has 7 1/2-inch underclearance.

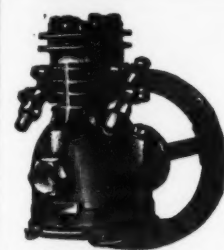
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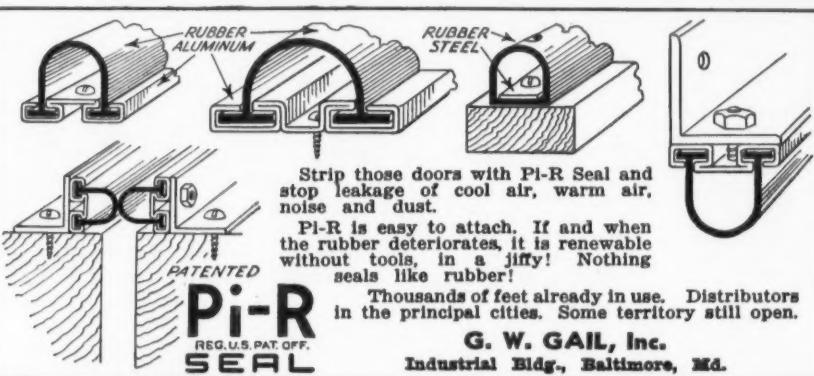
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'Speed Nuts' In Various Types of Construction

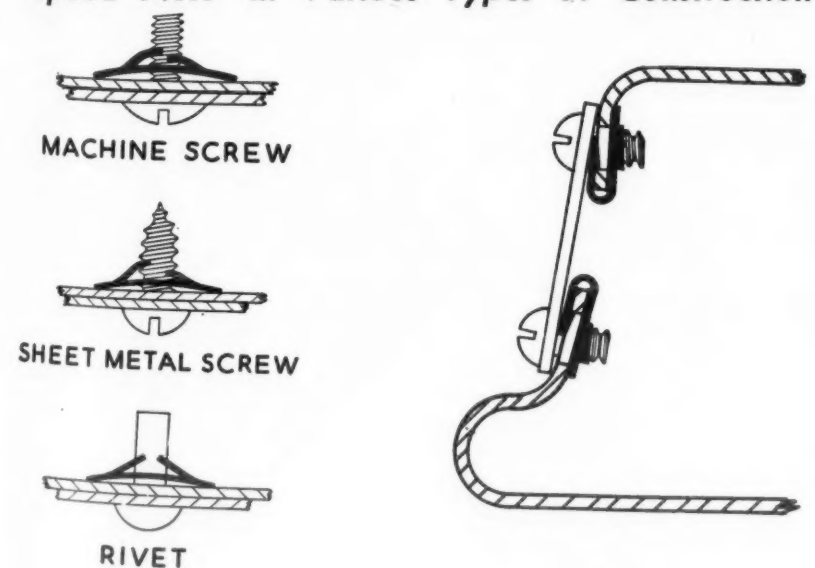


Fig. 1



Fig. 2

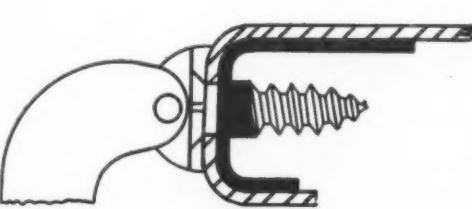


Fig. 3

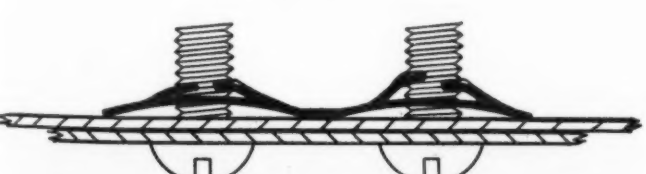


Fig. 4

The various ways in which spring tension fastenings are used for holding assembly parts together in cabinet construction are illustrated by these drawings.